AN EXPLORATION OF THE CONTINUING PROFESSIONAL EDUCATION NEEDS, INTERESTS AND ATTITUDES OF MEDICAL LABORATORY TECHNOLOGISTS IN NEWFOUNDLAND AND LABRADOR

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by

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ABSTRACT

Following the implementation of a mandatory model of continuing professional education (CPE) within the Newfoundland and Labrador (NL) medical laboratory science community, an exploratory study relating to the needs, interests, and attitudes of this unique group of health professionals was conducted. Utilizing a mixed methods exploratory design, this research serves to highlight the CPE preferences and attitudes of the medical laboratory profession of NL. Results indicated that despite historically limited CPE options within the province; NL medical laboratory professionals appear to have strongly positive attitudes towards CPE. Data suggests a preference for modern online learning methodologies and work related educational options. Informal learning methods are identified as significantly important to the workforce and a number of educational barriers to learning are identified including those of financial, personal, or familial nature. This research is of primary relevance to those interested in developing CPE options for medical laboratory technologists and other health professionals.

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ART – Advanced Registered Technologist, refers to any graduate of the advanced training program offered by the CSMLS continuing education division which is offered to general MLTs following their initial registration. This process was discontinued in 2011.

MLT – Medical Laboratory Technologist – Throughout this research, the abbreviation MLT is used to generalize those individuals who have completed pre-licensure training in the field of medical laboratory science or a very closely related discipline. The use of the post-nominal (MLT) is strictly controlled in Canada and is representative of the majority of laboratory professionals in Canada (CSMLS, 2013b).

MLA – Medical Laboratory Assistant refers to any graduate of an accredited training program in medical laboratory assisting that has led to CSMLS certification.

RT – Registered Technologist is an obsolete term utilized to refer to a current MLT.

Subject Technologist – Refers to any graduate who has obtained certification in a particular subject area designated by the CSMLS.

CSMLS – The Canadian Society for Medical Laboratory Science acts as the primary regulatory body for laboratory medicine in Canada. Initial Certification with the CSMLS is usually required for employment as a MLT within Canada.

NLSMLS – The Newfoundland and Labrador Society for Medical Laboratory Science acted as the provincial society for laboratory medicine in Newfoundland and Labrador until 2012.

NLCMLS – The Newfoundland and Labrador College of Medical Laboratory Science serves as the provincial college for laboratory medicine in NL. Formerly known as the NLSMLS, the College was formed following the implementation of provincial regulatory requirements.

NLCHP – The Newfoundland and Labrador Council of Health Professionals, serves as the regulatory body for medical laboratory science as well as other health professions in NL. The NLCHP is responsible for the auditing of professionals CPE requirements and regulates laboratory professional's ability to practice in NL.

CIHRT – The Commission of Inquiry on Hormone Receptor Testing was a NL judicial inquiry presided over by Justice Margaret Cameron which was established to probe into false results obtained within the NL eastern health authority's pathology laboratory. Commonly referred to as the Cameron Inquiry, the CIHRT was a pivotal event in NL laboratory medicine.

OLA – The Ontario Laboratory Accreditation serves as an external accreditation process implemented by the NL government following the events of the CIHRT. OLA serves as a benchmark for laboratory quality control.

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CHAPTER 1

INTRODUCTION

Medical Laboratory Technologists (MLTs) are health professionals who perform laboratory analysis and investigations, and interpret laboratory results to assist clinicians with the diagnosis, treatment, and monitoring of disease (Canadian Institute for Health Information, 2011). The role of the MLT is often broad, yet much of the work involves the operation of highly sophisticated clinical equipment, interpretation of biochemical testing, evaluation of scientific processes, and the manipulation of specialized instruments. The term 'laboratory technician' is commonly used to describe any individual working within such a scientific environment, yet the MLT, the technologist, is a distinctly different professional; a health professional by all accounts.

A clinical laboratory can be defined as an environment that pertains to the performance of investigative laboratory interventions through detailed analysis, assay, and examination of clinical specimens (Canadian Institute for Health Information, 2008). MLTs are additionally involved in areas outside of the clinical environment including roles as educators, researchers, and managers, though it must be noted that the vast majority of the MLT population is employed in clinical environments (CIHI, 2011). The provinces of Nova Scotia, New Brunswick, Ontario, Manitoba and Alberta report that 80.3% of MLTs are engaged in diagnostic and therapeutic laboratory results that are directly related to patient care (CIHI, 2011). MLTs are a driving force in the health care system, yet are perhaps one of the least understood of all health professionals. This

introductory chapter will serve to explore key educational aspects of this unique group, that makes up the largest portion of the allied health professions; the medical laboratory technologists who though unseen and rarely heard, serve as the diagnostic engine of Canada's health care system.

1.1 MLT - The Invisible Profession

In recent years, demands on diagnostic services related to advancements in medical care and changing treatment options have placed significant pressure on allied health professionals, resulting in a restructuring of the health care delivery model (Boyce, 2001). The transformation of existing professions and the emergence of new skills and technology have expanded the scope of numerous allied health professions allowing for the emergence of new fields of expertise (Nancarrow & Borthwick, 2005). MLTs and other laboratory professionals make up one of the largest groups of these allied professionals, ranking third in size, followed only by nursing and physicians (CIHI, 2011). MLTs can be defined, albeit loosely, as allied health care professionals who perform laboratory analyses and investigations, and interpret laboratory results to assist clinicians with the diagnosis, treatment, monitoring, and prevention of disease (CIHI, 2011). The Canadian Institute for Health Information (CIHI) (2011) indicated that the MLT community consists of approximately 19,664 professionals spanning seven regulated provinces, three unregulated provinces and the three Canadian territories, representing a ratio of approximately 1:1700 MLTs to Canadians. Given the unregulated status of three Canadian provinces and all Canadian territories (CIHI, 2011), it is

presumable that this number is even higher. The province of Newfoundland and Labrador (NL) alone represented over 500 practicing technologists, assistants, and students in 2011 (CIHI, 2011).

The sheer number of technologists across the country should indicate the importance of the laboratory medicine profession to the Canadian healthcare system; however, the role of the MLT remains somewhat misunderstood by a substantial portion of the Canadian public. Dr. Moira Grant, one of the more prominent researchers in Canadian MLT education, captures the essence of the MLT profession best when she states the following:

> *"The medical laboratory profession operates within the shadow of medicine. All the efforts and products of its practitioners' work are shielded from the public, resulting in limited public awareness of what they do. When laboratory testing is ordered by a physician or designate, the results are reported to and interpreted by the physician for the patient. The role of the technologist is rendered invisible."* (Grant, 2005)

It is the notion of invisibility that is perhaps most troubling within the MLT field. From a patient contact perspective, it is entirely possible, depending of course on the working dynamics of their employer that a practicing MLT will have little to no patient interaction throughout their entire professional life. That is, never communicating face-to-face with a single patient, yet reporting the results and observing the diagnosis of many others. In fact, estimates have indicated that up to 85% of decisions made by health care providers are directly influenced by the results of laboratory analysis (Canadian Society for Medical Laboratory Science, 2013b). Yet as Grant (2004b) states, the products of laboratory medicine practitioners are shielded from the public, and as such, the public

remains largely unaware of the existence of the MLT, despite the critical role that the laboratory professional has in their well-being. It is both fortunate and unfortunate that NL public awareness has recently changed, as the MLT community has come under significant scrutiny, making them a very visible profession indeed. It is this recent visibility and accompanied change in the professional education needs, perceptions, and attitudes of the NL MLT community which has served to spark the impetus of this research.

1.2 The Newfoundland and Labrador Medical Laboratory Technologist

Though the recent visibility of the NL MLT community has had significant impact on the profession, it is important to first discuss the NL MLT, and their role in the NL health care team. Within NL, the scope of practice for laboratory professionals is much like other health professionals, in that it encompasses a range of disciplines, skills, and educational attainment (CIHI, 2011). The practice of laboratory medicine is strictly controlled and limited through a national certification process employed by the Canadian Society for Medical Laboratory Science (CSMLS), which utilizes a competency based profile approach spanning a number of scientific areas (CSMLS, 2005). The competency profile of the CSMLS largely dictates the scope of practice followed by MLTs. In the case of the most common MLT certification (85% general certified in Canada), it includes 11 major categories encompassing aspects of safe work practices, laboratory analysis, analytical techniques, quality management, and professionalism (CSMLS, 2005; CIHI, 2011). Using this competency profile as a blueprint for scope of practice,

laboratory technologists perform vital testing on patient specimens to aid in diagnosis, management, and treatment of disease. The majority of laboratory technologists are employed in clinical laboratories throughout Canada, which includes a number of areas of diagnostic analysis (CIHI, 2011). This pattern also holds true for the study population of MLTs in NL (Keeping, 2000). Typical clinical analysis and final reporting performed by the MLT is extremely broad, but for illustrative purposes may include a number of areas such as identification of atypical cells (e.g., leukemic), analysis of bodily fluids for normal and abnormal constituents, detection and identification of normal and abnormal micro biota from clinical specimens, identification of atypical antibodies that impact blood transfusion, and preparation of histological specimens for analysis by pathologists (CSMLS, 2005).

Fundamentally, it is a highly technical and demanding branch of medical science linked heavily with the specialized medical field of pathology. It cannot be overstated, that the testing performed by MLTs is intricately intertwined with virtually every aspect of medicine including but not limited to surgery, dialysis, diagnostics, emergency medicine, and acute care. As previously identified, diagnostic testing within these and other fields has been shown to be directly responsible for up to 85% of diagnosis in the clinical setting (CSMLS, 2013b). Additionally, outside of the scope of the general MLT, further advanced areas exist, including the exponentially growing fields of clinical genetics technology, cytotechnology, and pathology assisting (CSMLS, 2013b). Furthermore, rapidly changing technology has seen the emergence of a number of highly specific disciplines beyond those that fall under the broad scope of the laboratory

technologist. Fundamentally, MLTs operate in a fast paced, highly technical, and patient centered profession where the rapid change in technology creates a work environment that is incapable of stasis (i.e. changes are continual) (Nancarrow & Borthwick, 2005).

Changing medical technology and the dynamics of biochemical analysis create an environment which fosters a need to update one's skills to meet the demands for an increasingly technical and often interprofessional health care environment. Medical laboratory technologists must be continuously aware and up to date on advances in their field if they are to deliver the best possible patient care. For this reason, it is imperative to explore the past, present, and future of continuing professional education (CPE) for this particular group of professionals. This is largely due to their direct public impact, growing field of practice, and future roles within the health care team at both the provincial and national level. Though research is highly limited in relation to the MLT community, the recognition of the need for CPE has been well documented in other health professions and the need for CPE in the NL MLT community has recently come to light.

1.3 The Cameron Inquiry

In 2007, the NL MLT community came under scrutiny at a national level when it was indicated that the Eastern Health authority of NL, may have been responsible for a number of false reports regarding hormone receptor testing (Grant, 2011). The hormone receptor test commonly referred to as ER/PR (estrogen receptor/progesterone receptor) can be utilized as an indication for treatment of certain breast cancers (Grant, 2011;

Cameron, 2009). Questions initially arose regarding the validity of results that had been obtained within the Eastern Health laboratory when a number of tests that had previously been reported as negative, were retested and indicated substantially different results known as conversions (Grant, 2011). This was first investigated in 2005, from a patient who had been diagnosed with an invasive lobular breast cancer that indicated a very unusual ER/PR result (Cameron, 2009). It cannot be understated that this was an incredibly significant laboratory error as the results of ER/PR testing had direct impact on cancer patient therapy (e.g., patients may not have received the correct chemotherapy) (Cameron, 2009). This concern was widely publicized in NL, as well as national media, and resulted in the Commission of Inquiry on Hormone Receptor Testing (CIHRT), in which Justice Margaret Cameron was appointed to investigate into the estrogen and progesterone receptor tests performed in NL from 1997 to 2005 (Cameron, 2009).

The implications of the CIHRT have been far reaching and have had substantial impact on a number of health care dynamics within NL including laboratory medicine. Relevant to this research, were specific recommendations which have had direct impact on the educational dynamics of clinical laboratory departments of NL following the CIHRT (Cameron, 2009). The most significant of these recommendations in relation to continuing education research was the recommendation that a number of health care professionals falling under the designation "allied health professions" become a group of regulated bodies (Cameron, 2009). That is, allied health professionals including but not limited to MLTs, would be required to maintain a professional license, which would incorporate a mandatory continuing education (MCE) component, in order to practice.

MCE can be defined as continuing professional educational courses and/or programs beyond the entry level education requirements for a profession, that are taken for credit as mandated by licensure boards, professional organizations, or workplace organizations in order to retain licensure, certification, or employment (Little, 1993). This concept is discussed further in chapter two, but it should be acknowledged that the implementation of such a process would bring NL MLTs in line with the majority of Canadian provinces (CIHI, 2011).

Such a recommendation likely stems from a widely accepted and growing number of MCE programs in Canada (Curran, Fleet, & Kirby, 2006a). The use of MCE approaches within the professional regulatory systems of laboratory medicine has been well established throughout Canada and the implementation of such a program would bring laboratory medicine in line with seven other regulated provinces such as Nova Scotia, Alberta and Ontario (CIHI, 2011). It must be noted that until the recommendations made within the CIHRT were announced, there had historically been no official or widely accepted form of mandated CPE for MLTs within NL, nor had there been any form of monitoring related to the CPE participation of the MLT community. Research into the CPE participation of the NL MLT community has also been highly limited with little to no data in existence. The recommendations made by Justice Cameron, served to irreversibly change the face of laboratory medicine in NL, and the CIHRT was arguably of the most significant events in the history of NL medical laboratory science.

1.4 Repercussions of the Cameron Inquiry

Following the events of the CIHRT and acting in part upon the recommendations of the CIHRT, the Government of NL created legislation which would bring allied health professionals under a system of umbrella legislation, where a select number of allied health professions including laboratory medicine, would become regulated professions in NL (Newfoundland and Labrador Council of Health Professionals, 2013b). This legislation was passed and proclaimed in October 2012, which aided in the formation of the Newfoundland and Labrador Council of Health Professionals (NLCHP). The NLCHP is responsible for governing the regulation of seven health groups designated under the Health Professions Act (HPA) of 2010 (Government of Newfoundland and Labrador, 2010). While regulation under the HPA for MLTs did not come into effect until its proclamation in 2012, it was well known by the MLT community that a formal system of CPE maintenance would be required pending the eventual proclamation. The Newfoundland and Labrador College of Medical Laboratory Science (NLCMLS), in cooperation with a number of vested groups, structured a system which evaluated and documented the continuing education credits that technologists were to obtain (Newfoundland and Labrador College of Medical Laboratory Science, 2013) (see Appendix A). As of October 2012, NL has officially become a regulated province for the practice of medical laboratory science (Government of Newfoundland and Labrador, 2012) and as such, the program proposed by the NLCMLS has been implemented. The full impact of MCE has yet to be evaluated within the NL MLT context, but the CPE programming can be explored and its implications discussed.

Within the approved CPE criteria, a number of formal and informal learning activities are credited towards the minimum mandated CPE. This ranges from formal university/college level courses, to participation in conferences, to article review. Notably, much of this proposed credit system is structured around traditional CPE activities that MLTs would have been exposed to, such as key operator training (e.g., training provided by vendors on new equipment), CSMLS provided programs, and conference participation. While numerous details of CPE and its impact have been explored in other health professional disciplines (Barriball, While, & Norman, 1992; Curran et al., 2006a; Hagus, 2000), within the MLT community of NL the notion of MCE is relatively new and an exploration of the value of CPE and how CPE is perceived by the NL MLT community is needed.

In addition to the changes associated with the structured MCE system for the medical laboratory profession, a second impact of the CIHRT is apparent in the educational environment of the MLT community. The CIHRT recognized the value of external accreditation of laboratory medicine departments (Cameron, 2009). As such, laboratory facilities in NL were mandated to undergo an external accreditation process to ensure compliance with best established processes (Ontario Medical Association, 2013). Within NL, the accrediting program selected was the Ontario Laboratory Accreditation (OLA) program that was developed and delivered through the Ontario Medical Association – Quality Management Program. The OLA program, implemented in 2000 is mandatory for all licensed Ontario medical laboratories and places significant emphasis on what is referred to as modified ISO standards (Bradley, 2007). OLA brings laboratory

practices and procedures in line with accepted standards and places significant importance on quality control/quality management practices. The acronym OLA became ubiquitous in NL following the CIHRT and significant resources were invested into NL laboratories in an attempt to meet OLA standards. Currently, all clinical laboratories in NL hold OLA certification (Ontario Medical Association, 2013) which has likely influenced the CPE needs of the MLT community in NL.

Fundamentally, the impact of the recommendations made by Justice Cameron following the CIHRT has forever changed the profession of laboratory medicine within NL, but the full educational impact of this historic event has yet to be realized. As a formal MCE system for MLTs is a new addition for the province, research into the continuing education needs, both perceived and ascribed becomes integral to creating effective CPE programs.

1.5 Study Purpose

The purpose of this study was to explore the CPE needs, interests and attitudes of MLTs in NL. This study contributes to and builds upon an existing body of literature relating to CPE in health professional education. The study serves to address an evidence gap relating to the CPE needs of the NL MLT profession. A shift towards a mandatory model of CPE occurred within the MLT profession while this study was in progress. The goal was to shed light on aspects of CPE from an MLT perspective including aspects of educational barriers, perceived and ascribed needs, educational enablers, and topics of

interest or need. The study also serves to explore how attitudes towards CPE might be influenced by the background characteristics of MLT professionals.

1.6 Rationale for MLT CPE Study

The professions have long recognized the need to maintain skills through CPE activities (Houle, 1980). Health professionals are no exception to this and often participate in practice-enhancing learning activities (Kerka, 1994). This may be attributed to the perspective that being a professional implies a commitment to continuing one's education through CPE (Kerka, 1994). It is important however to recognize that these activities can be very broad in nature. According to Curran et al. (2006a) CPE can encompass all of the formal, informal, and non-formal learning activities that are intended to engage and maintain professional competency. Specific to the MLT, the MLT Learning Network (2010) indicates that MLTs do not follow a linear learning path and instead, follow a diverse and complex approach to CPE. This perspective on CPE may be utilized to create a scope of activities that range from actions such as simply asking a question of a colleague, to reading an article, to mentoring, to engaging in formal learning. Despite the somewhat unstructured approach to CPE that has traditionally been in place in NL, the shift towards a mandatory model of CPE raises numerous questions around the future of CPE within the NL MLT community. The rationale for MCE is discussed further in chapter two.

Historically, there has been minimal formal (university/college) CPE within the NL MLT community. For example, in 2001 NL reported the lowest percentage of MLTs

with university degrees (Grant, 2004a). This may be attributed to a lack of regulation, lack of licensing requirements, geography of the province, or the relatively low levels of employer financial support for CPE participation (e.g., MLTs do not receive additional remuneration for completed baccalaureate level formal CPE) (Newfoundland and Labrador Association of Public Employees and Private Employees, 2008). Union agreements also indicate minimal employer support in the way of tuition or registration fee compensation for formal CPE participation, though notably aspects of educational leave are present (NAPE, 2008). As a result, CPE activities have mainly been of an informal nature, as senior MLTs would often pass knowledge on to junior MLTs directly or through activities such as advanced operator training, or implementation of new techniques (MLT Learning Network, 2010). This pattern continues today as the nature of the MLTs work environment often follows a hierarchical structure (e.g., Tech I, Tech II, and Tech III) with progressively higher levels of responsibility and experience (NAPE, 2008). While CPE activities of an informal and non-formal nature may have been abundantly present in the form of mentoring, lecture attendance, grand rounds, or conference attendance, a tracking system documenting the CPE processes of MLTs has not been in place at the provincial level. This lack of documentation follows through to some degree at the national level as MLTs who initially become registered with the CSMLS, are not required to engage in CPE activities to remain a member of the society (CSMLS, 2013b). Therefore, provinces in which the MLT professions are not regulated may not mandate any form of CPE beyond initial registration. The relative novelty of the mandated CPE process in NL and the historical low levels of formalized CPE for the

MLT profession, raise a number of questions regarding the CPE interests, habits, and participation of the medical laboratory profession within NL, and the subsequent need for a structured needs assessment.

1.7 Rationale for Needs Assessment Approach

Given the potential emerging market of adult learners that may be interested in continuing education, as a result of the implementation of licensing requirements, it becomes important to understand the needs and wants of this unique group, so that institutions can better prepare for delivery of programs. This must be considered at the formal (university/college) level as well as the informal (workplace) level.

From a formal perspective, MCE for the MLT is particularly interesting within the confines of NL, as Memorial University functions as the only Association of Universities and Colleges of Canada (AUCC) accredited university able to offer entry level and advanced degrees to residents of the province (Association of Universities and Colleges of Canada, 2013; Government of Newfoundland and Labrador, 2005a). This is furthered by the ability of Memorial University to offer accredited distance based learning programs (Canadian Virtual University, 2013). One such program that has already been implemented for this particular group is the "Bachelor of Technology" degree program. This distance based degree completion program has been structured to allow technologists from various backgrounds including those of health science and engineering, to enhance their formal education via completion of a baccalaureate degree (Memorial University, 2013). Comparable programs throughout Canada include the

"Bachelor of Allied Health Science" offered by the University of Ontario Institute of Technology (UOIT) and the "Bachelor of Health Sciences" offered through Dalhousie University as well as numerous others (Dalhousie University, 2013; University of Ontario Institute of Technology, 2013).

From an informal perspective it is important to acknowledge that traditionally, MLT CPE activities have been linked to informal mentoring activities conducted by clinical personnel. This phenomenon is easily observed in the MLT Learning Network report which indicates very high levels of informal CPE participation, such as gaining advice from expert colleagues (MLT Learning Network, 2010). Informal learning has been and remains an integral component of the MLT community and this is likely to continue. Formal learning has also historically been a large component of the CPE pursued by the MLT profession as new technology requires advanced operator training that is provided by industry. Notably, informal CPE activities and industry linked activities are incorporated in the proposed education requirements by the NLCMLS (see Appendix A).

Given a lack of empirical evidence relating to NL MLT CPE and the changing nature of CPE within the province, it is important to engage in a needs assessment to determine how current and future CPE activities might address the needs of the MLT community. Needs assessments are useful tools used by a variety of organizations, agencies, and social scientists, to identify what a particular group of persons lacks relating to specific topic. While multiple definitions exist, it can be considered in this instance, as a systematic and ongoing process of providing usable and useful information

about the needs of a target population, and is a process which is population specific, but systematically focused, empirically based, and outcome oriented (Reviere, Berkowitz, Carter, & Ferguson, 1996). Needs assessment allows for an understanding of the intricate nature of a specific group dynamic and is accepted universally as a critical element of adult education programming (Kowalski, 1988). Since little empirical research appears to exist relating to the needs of MLTs within NL, a detailed exploration into this group serves to explore the unique aspects of laboratory medicine and its CPE requirements.

1.8 Research Questions

The research was guided by the following broad questions which were informed by existing CPE literature and research within the MLT community:

1. What are MLT professionals' attitudes towards CPE and MCE;
2. What are MLT professionals' perceived CPE needs;
3. What are MLT professionals preferred formats for participating in CPE;
4. What are the perceived barriers and enablers to participation in CPE and;
5. What is the relationship between MLT professionals' background characteristics and attitudes towards CPE and CPE needs?

1.9 Implications of Research

Given the large stake that medical laboratory education has in the health of the public, a number of benefits may arise from the findings of this research. Most importantly, an understanding of the needs of this unique group has the potential to help

inform future CPE options that are specifically structured to the MLT community. Needs assessment remains a valuable tool in the educational process, and the development of programs to meet the needs of those who are willing to participate is essential (Cantor, 2008).

The development of CPE programming that is aligned with the needs of the profession is likely to have a number of positive effects. This has been well documented in a number of health professions including medicine and nursing (Bloom, 2005; Gray & Herr, 1998). These benefits may include positive impact on patient or health outcomes, improved job satisfaction, improved retention, or more efficient and effective organizational operations. Thus, an increased understanding of the needs of the profession may offer those involved in educational development useful insights into the needs of this unique group, and result in more effective CPE opportunities both formally and informally.

1.10 Summary

Chapter one provides a brief introduction to the MLT profession, its practitioners, and presence in the Canadian health care system. The rationale behind a recent shift towards a mandatory model of CPE is explored, as well as the use of a needs assessment approach to explore the implications of such a shift in an attempt to answer a number of questions which arise relating to CPE. Chapter two provides an exploration of the extant literature relating to the topic of CPE as it pertains to this exploratory study.

CHAPTER 2

LITERATURE REVIEW

A review of the literature pertaining to CPE was conducted, revealing that a number of concepts and principles commonly associated with CE/CPE correspond to the MLT community. Additionally, a review of the national MLT profile and CPE movements and educational developments within the MLT community reveals a changing CPE perspective at the national level. While the literature relating to the MLT profession at a national level indicates relatively positive attitudes towards CPE, and provides insight into the CPE perceptions of professionals, virtually no literature exists relating specifically to the MLT profession in NL. Unfortunately, the literature on Canadian medical laboratory science is also extremely limited (Grant, 2004b). This is perhaps due in part to the fact that Canadian MLT professionals rarely engage in academic research. According to Grant (2004b) this may stem from an overall perspective that MLTs perceive themselves as just "lab techs" and not academics or researchers by nature. In the existing research, Dr. Moira Grant, a former researcher with CSMLS and MLT educator, is a significant contributor to the understanding of CPE as it relates to the Canadian MLT community. Much of Grant's work provides a launching point and theoretical basis for further research in the medical laboratory science field as it relates to CPE.

2.1 The Rationale for CPE in the Health Professions

A 2003 study indicates that one of the distinguishing characteristics of a profession is the commitment by its members to lifelong learning (Health Canada, 2003). The concept of continuous learning is one that has continued to grow in recent years, largely in part to an increase in societal expectations for greater accountability and professional competence of professionals (Friedman, 2012). Continuous learning is a very broad topic encompassing numerous facets of the educational process. Such terminology as continuing professional education, continuing education and continuing professional development commonly occur within the literature and while they are directly related, differences exist. Kiceniuk (1993) discusses differences amongst these definitions, citing factors associated with knowledge updating, self-direction and various learning methods, while Barriball et al. (1992) discuss components of providers and delivery indicating that continuing education is more self-directed while continuing professional development is more workplace oriented.

While distinctions exist, within the context of this research, the terminology continuing education (CE), continuing professional education (CPE), and continuing professional development (CPD) may be considered interchangeable. Collectively, these terms are considered the undertaking of activities or processes which are directly related to one's professional life, in order to expand one's knowledge, skills, or attitudes, in a post-licensure setting or environment.

Despite differences in definition, growth in CPE in recent years cannot be underestimated. This is particularly true in those instances in which the pursuit of

educational activities is motivated by external factors such as increased public accountability of health care professions (Friedman, 2012). Today, virtually all professions recognize value in CPE processes and are likely to utilize significant resources in the pursuit of CPE activities (Friedman, 2012). Kiceniuk (1992) suggests that CPE has in fact become a multi-billion dollar industry. Despite the growth in CPE, it is important to note that questions arise as to why this growth and acceptance appears to be so universal. What is CPE, and does CPE have an impact on the profession, the professional or in the case of the health care professional, the patient?

Williams and Brown (1996) claim that knowledge has a half-life of approximately 2 ½ years and that by the end of that period, knowledge has become outdated or obsolete. This is a sobering thought when one considers the exponential changes that are observed within the medical community (Nancarrow & Borthwick, 2005). Rapid changes occurring in the health sciences sector make it increasingly challenging for health care professionals to stay abreast of the latest health research information, and to be current in their practices (Whitten, Ford, Davis, Speicher, & Collins, 1998). Houle (1980) makes a compelling argument when stating that knowledge is growing at a far greater pace than the human mind that absorbs it, while some literature suggests that in the case of medical education, an underlying assumption, is that continuing medical education improves healthcare practice and, thereby, health outcomes for patients (Forsetlund et al., 2012). Grant (2004a) highlights that professional development activities are seen to be a constructive element of professional practice while Balachandran and Branch (1997) suggest that CPE is an accepted means for disseminating new knowledge to professionals

and ensuring professional competence. Brown, Belfield, and Field (2002) indicated that CPD for healthcare professionals is an important strategic instrument for improving health, while additional authors indicated that providing current and relevant continuing education activities is an integral part of maintaining a highly competent workforce (Penz et al., 2007).

Fundamentally, participation in CPE activities and systems of MCE, have become a well-recognized and accepted means of maintaining one's professional skills, practices, and competencies. A strong demand to maintain competencies has been a priority in the health professional fields and in many ways characterizes what it means to be a health professional (Friedman, 2012; Houle, 1980; Roberts & Scott, 1988). It has been argued that CPE in the health professions must be mandatory (Fisher & Pankowski, 1992) given the role and accountability of health professions to providing quality and safe patient care (Morgan, Cullinane, & Pye, 2008). Others argue that mandating CPE may not serve to encourage learning (McCormick & Marshall, 1994) and the effective measurement of MCE and whether or not learning has occurred has been called into question (Friedman, 2012). Yet, given the myriad of both historical and current acceptance of CPE within the literature, it is no surprise that both mandated and voluntary lifelong learning and continuing education are integral aspects of many professional fields including the medical laboratory field. Despite existing concerns surrounding the validity of MCE, the acceptance of MCE practices within professional cultures is difficult to refute, and it becomes important to explore the concept of MCE. This is particularly true given the impact of recent implementation of MCE within the NL MLT community.

2.2 Mandatory Continuing Education (MCE)

Despite a relative acceptance of CPE across numerous professions, an interesting component begins to arise within the literature. While it may be assumed that some natural level of CPE activities has occurred throughout the history of the health professions (such as the case of on-the-job training), in recent years a shift has occurred in which CPE has developed a mandatory component (Curran et al., 2006a). That is, MCE has emerged and has become a widely accepted practice across health professions in Canada (Curran et al., 2006a; Friedman, 2012). Essentially, professionals are increasingly being made accountable for documentation of their continuing learning process and in some cases, may face sanctions if the required CPE program has not been completed.

MCE has been given a number of varying definitions but within the context of this research, it may be considered as the following: CPE courses and/or programs beyond the entry level educational requirements for a profession, that are taken for credit as mandated by licensure boards, professional organizations, or workplace organizations in order to retain licensure, certification, or employment (Little, 1993). While this definition is one of many, it highlights the key components of the nature of MCE. Essentially, for health professionals to continue their practice, they must engage in a structured learning path as prescribed by some outside authority. Notably this path does not necessarily mean formal learning (e.g., university or college courses) as may be assumed, but can encompass any number of learning activities ranging from those that

are informal, non-formal or formal. Given that a structured MCE approach may incorporate various forms of learning, it is important to distinguish between these terms.

The Organization for Economic Co-operation and Development (OECD) (2007) defines formal learning as a type of learning that is intentional, organized, structured, and usually arranged by institutions (e.g., college or university course). Non-formal learning may or may not be intentional or arranged by an institution, but is usually organized in some way, though lacks granting of formal credit. Workplace based approaches to learning will often fall within this category. In contrast to these, informal learning is never organized, and rather than being guided by a rigid curriculum is often thought of as experiential or spontaneous (OECD, 2007). The concept of networking for example could be considered an informal approach to learning. Therefore, MCE approaches may utilize any of these forms of learning incorporating components such as article review, mentoring, networking, or other informal learning which can be documented or demonstrated as being completed. This can be observed in the MCE requirement of the NL MLT community (see Appendix A).

Fundamentally, MCE is by no means a new process and it has evolved from the recognition that professionals need to be engaged in CPE to maintain their competence (Little, 1993), and to meet accountability to society as seen in the health care setting (Lowenthal, 1981). Despite the positive intentions for MCE systems and potential outcomes there has been criticism of such approaches to promoting professional competence. Kerka (1994) discusses MCE from a pro/con perspective and highlights some key characteristics including arguments that voluntary participation is unrealistic,

mandates are necessary to protect the public from incompetent practitioners, and well-designed programs can influence practice. Kerka (1994) further highlights arguments against MCE, indicating that evidence demonstrating MCE results in improved practices is lacking, and that requiring participation may hinder learning by reducing motivation. Brow, Belfield and Field (2002) also indicate that empirical research relating to the cost effectiveness of CPE in healthcare is limited at best. Additionally, educators commonly accept that adult learners should be self-directed and self-motivated and that the initiative to learn must come from the learner themselves and not from an external body (McCormick & Marshall, 1994). Despite these concerns, the reality of MCE is quite clear. Many professions have seen substantial growth in CPE processes in recent years and this growth is expected to continue (Friedman, 2012).

Fundamentally, there will likely remain arguments for and against MCE, yet the trends in Canada remain clear. Acceptance of MCE as a means to ensure competence appears to be widespread in a number of the health professional fields (Curran et al., 2006a) and given the growing sentiment for greater social accountability in the health professions, this trend is likely to continue. This CPE trend can be observed in the context of Canadian laboratory science. Curran et al. (2006a) reported that only Saskatchewan, Ontario and Nova Scotia mandated MLT professionals' participation in CPE for re-licensure. Since the initiation of this study, Alberta, Manitoba, New Brunswick and Quebec have additionally imposed MCE requirements on laboratory professionals (College of Medical Laboratory Technologists of Alberta, 2013; College of Medical Laboratory Technologists of Manitoba, 2013; College of Medical Laboratory

Technologists of Ontario, 2013; New Brunswick Society for Medical Laboratory Science, 2013). NL has very recently become the 8th regulated province and has also implemented mandatory CPE requirements (NLCHP, 2013b; NLCMLS, 2013).

Thus, the growth of mandated CPE across the Canadian MLT spectrum cannot be understated, yet little is understood regarding how MLT professionals perceive the implementation of such mandated approaches due to the relatively recent introductions of such regulatory systems (CIHI, 2011).

2.3 MLT Professional Demographics

As of 2011, the Canadian MLT profession was regulated in seven of ten provinces and unregulated in all Canadian territories (CIHI, 2011). Regulation within the health professional context may be loosely considered as those provinces that require actively practicing medical laboratory professionals to meet minimum educational requirements, register with their provincial association, and engage in a prescribed plan of continuing professional education (Government of Newfoundland and Labrador, 2010). It should be noted that all provinces may not mandate CPE.

A well-documented phenomenon in the laboratory profession throughout Canada has been the uneven ratio of males to females. The MLT profession is highly female dominated with a reported 85% female workforce nationally (CIHI, 2011). This gender ratio has also been reported in other developed countries including the U.S. and Sweden (Grant, 2003b). Keeping (2000) reported that in 1999, 70% of MLTs in NL were female, which is markedly less than other provinces given national demographics. Regardless of

exact figures, a clear gender profile exists which may have impact relating to CPE dynamics. For example, females may be more likely to indicate family responsibilities, such as child care, as a key barrier to CPE participation (Merriam, Caffarella, & Baumgartner, 2007).

Age has also been documented as having significant impact on educational participation including aspects of continuing education in the health professions. Lammintakanen and Kivinen (2012) indicated that there were variations in both the CPD practices that nurses of different ages used, and in their attitutes to CPD, suggesting that younger nurses particpated least in CPD in general. Grant (2004a) indicated that MLTs who were older were more likely to participate in CPE activities, while Merriam et al. (2007) suggest that social components associated with various age groups, may impact barriers to adult learning (e.g., older adult learners cite more dispositional barriers while younger learners are more constrained by situational barriers). The CIHI (2011) reports that for the seven regulated provinces in 2011, only 21.6% of MLTs were younger than 35 while 23.9% were older than 55 with an MLT overall mean age of 45. Keeping (2000) indicated that greater than 50% of laboratory professionals practicing in NL in 1999 were aged 41 and higher and that the number of retirements was expected to increase in the following 15 years.

Given these demographic characteristics of the provincial MLT population it is important to consider how these features might influence participation in and attitudes towards CPE.

2.4 The Canadian MLT CPE Environment

Given the technological nature of the medical laboratory field, advances in medical and other healthcare sciences are a fundamental reason for laboratory professionals to engage in CPE activities. Fisher and Pankowski (1992) indicate that continuous rapid changes in the clinical laboratory field make CPE imperative in the clinical laboratory professions. The MLT Learning Network (2010) further indicated that Canadian MLTs are experiencing the demands of a workplace that is rapidly changing, largely due to changes in the health care system, demographic shifts, and emergent technology. The point raised by the MLT Learning Network (2010), however, cannot be overstated given the exponential changes that have occurred in diagnostic technology over the past decade. Technology has shifted so rapidly that the CSMLS competency profile allowing entry level technologists to practice in Canada, has recently been altered to include areas not previously seen (e.g., genetics technology, DNA sequencing, and molecular diagnostics) (CSMLS, 2005). Therefore, a substantial portion of Canadian MLT professionals could arguably be lacking in specific formal and advanced training areas. Thus, the importance of CPE in the workplace becomes even more apparent as a result.

While CPE as a whole has remained a heavily discussed area or component of laboratory medicine, CPE research within the field of Canadian laboratory medicine remains exceedingly limited. Research from other countries including the U.S. and U.K. appears more plentiful but the variations in career structure (e.g., baccalaureate degree entry) influence the generalization of such work to the Canadian context. The CSMLS

maintains substantial CPE endeavors including a complement of courses, advanced certification (recently discontinued), and a national congress in an attempt to encourage CPE, yet there is little empirical evidence within its own publications relating to the documented benefits of CPE to the laboratory professional. A complete review of the Canadian Journal of Medical Laboratory Science (CJMLS) publication from the years of 1999 to 2012 revealed substantial evidence in the form of editorials, letters and peer reviewed articles, to indicate significant support for CPE activities throughout the profession, yet only a single (though very significant) peer reviewed study relating to professional development perceptions in the Canadian MLT community was identified.

Fundamentally, CPE activities may seek to alter patient care through changes implemented by those engaged in learning (Morgan et al., 2008). CPE activities and outcomes, however, are very broad and therefore may be completed in any number of ways such as increasing the knowledge base of the professional, maintaining the competencies, or merely enticing the professional to be more engaged within their field. From an individual perspective, MLTs must also consider an aspect of CPE benefit outside the patient context. For example, advancements in the workplace have traditionally been linked to continuing education (Gray & Herr, 1998). In recent years, this has been shown to be especially true for laboratory technologists of NL as technologists are represented almost exclusively by the Newfoundland and Labrador Association of Public and Private Employees (NAPE) (NAPE, 2008). With this unionization comes the fundamental component known as seniority which has traditionally been the primary means of advancement within the union laboratory settings

of the province (NAPE, 2008). CPE provides those MLT professionals an opportunity to advance their careers through professional development and enhancement of professional and leadership competencies outside of this union advancement. This is particularly true in the case of the generalist MLT moving to more advanced disciplines including those of cytology or genetics technology, as these respective roles have an initial employment level of "Tech III" in NL (NAPE, 2008). According to a survey report by the MLT Learning Network, 95% of MLTs agree that continuous learning is critical to maintaining basic knowledge and skills, while 96% report that CPE is also essential to keeping up with scientific and technological advances of the profession (MLT Learning Network, 2010). At a national level, it would appear that MLTs agree that CPE is an integral part of their professional practice.

2.5 Medical Laboratory Education and CPE in Canada

Canadian MLT programs are predominately offered through community colleges or public universities, and each province dictates the program requirements necessary to award the associated diploma or degree in medical laboratory science or technology (AUCC, 2013). Though several baccalaureate degree level programs exist, regardless of pre-licensure education requirements, all technologists must successfully complete the CSMLS national certification examination to practice in most Canadian provinces and territories. To be eligible to write the CSMLS national exam, programs must be approved by the CSMLS and externally accredited by the Canadian Medical Association Conjoint Accreditation Services (Canadian Medical Association, 2013). Table 1

summarizes the majority of formal pre-licensure, education programs delivered in English-language throughout Canada. It should be noted that Canadian MLT pre-licensure educational qualifications differ starkly from numerous OECD countries such as the U.S. and U.K., in that most Canadian programs are at the diploma level (CSMLS, 2013b).

Table 1 Canadian Medical Laboratory Technology Pre-licensure Education

Provence	Institution	Approximate Duration (Years.)
Alberta	• Northern Alberta Institute of Technology	2
	• Southern Alberta Institute of Technology	2
	• University of Alberta	4
British Columbia	• British Columbia Institute of Technology	2.5
	• College of New Caledonia	2.5
Manitoba	• Red River College of Applied Arts, Science and Technology	2
New Brunswick	• College Communautaire du Nouveau-Brunswick	2.5
	• New Brunswick Community College	2.5
Newfoundland and Labrador	• College of the North Atlantic	3
Nova Scotia	• Nova Scotia Community College	2

Table 1	**Canadian Medical Laboratory Technology Pre-licensure Education (continued)**	
Ontario	• Cambrian College of Applied Arts and Technology	2.5
	• St. Clair College of Applied Arts and Technology –Degree/Diploma	4
	• St. Clair College of Applied Arts and Technology – Diploma only	3
	• St. Lawrence College	3
	• The Michener Institute for Applied Health Sciences	2.5
	• University of Ontario Institute of Technology	4
Saskatchewan	• Saskatchewan Institute of Applied Science and Tech.	2

Canada has a vast array of pre-licensure training programs and has substantial variation across provincial CPE regulations and requirements. All provinces with the exception of Quebec also require CSMLS certification as a pre-employment criterion in clinical sites and MLT professionals who remain members of the CSMLS, have available to them a significant database of CPE programming options offered through the CSMLS (CSMLS, 2013b). These options are often provided at no cost to the member and are structured heavily towards an online learning style. Provincial variations do exist however in relation to formal options.

2.6 Enablers and Barriers to MLT CPE

The Canadian Council on Learning (CCL) identifies four fundamental categories of barriers to participation in adult education and training including situational,

institutional, dispositional, and academic (Canadian Council on Learning, 2007). Situational barriers are those barriers that can occur at any particular time in a person's life (CCL, 2007). MLTs have been shown to highlight work, financial, and familial responsibilities as being primary barriers to CPE (MLT Learning Network, 2010). Institutional barriers include those that are structured largely around institutional policy like those of tuition, entrance requirements and course delivery (CCL, 2007). Given the two most often cited reasons for nonparticipation are lack of time and lack of money (Merriam et al., 2007), the implications of both situational and institutional barriers becomes very clear. Unfortunately, one of the more prominent reasons that CPE may be hindered within the laboratory community is a lack of employer financial support (MLT Learning Network, 2010). Grant (2004a) further indicated a number of barriers relating to MLT CPE participation including lack of recognition from employers, lack of suitable courses, costs, household and family responsibilities, and even more pronounced, a lack of time. Curran, Fleet, and Kirby (2006b) identified that components of financial support, lack of remuneration, costs, and geographic isolation served as important barriers to continuing education for rural health care professionals. Costs, lack of employer support, household responsibilities, work commitments, and time constraints have also been identified as chief barriers in nursing continuing education (Chong, Sellick, Frances, & Abdullah, 2011).

2.7 Summary

Chapter two provides an overview of the literature pertaining to the CPE dynamics of the MLT profession as well as a brief environmental scan of the Canadian MLT educational and demographic profile. This review of the literature makes it clear that the volume of empirical evidence relating to the CPE preferences of the MLT community is highly limited, though substantial literature exists relating to broader aspects of CPE from an educational standpoint, including those of barriers and enablers. Next, chapter three will provide a detailed overview of the methodology used throughout the research and will serve to explain the research approach taken.

CHAPTER 3

METHODOLOGY

This research study followed a mixed-methods exploratory sequential design as described by Creswell (2012) and incorporated both quantitative and qualitative methodological approaches (Jupp, 2006). This mixed methods exploratory approach consisted of two stages of data collection that included focus groups with a purposive sample of MLTs within NL and a subsequent questionnaire survey of the NL MLT population.

According to Creswell and Plano Clark (2011) numerous versions of mixed method designs exist but several of the more common designs include those of a convergent, exploratory sequential, embedded, transformative, or multiphase nature. Creswell (2012) further explores these forms of research as they relate to their application in educational theory. Given the relative lack of empirical evidence relating to the continuing education of the MLT community in NL, it was decided that an exploratory sequential design would prove most appropriate. According to Creswell (2012) an exploratory sequential mixed methods design first involves gathering qualitative data to explore a phenomenon followed by the collection of quantitative data in an attempt to explain relationships identified in the qualitative data. Accordingly, qualitative data was first collected via focus group interviews which were subsequently analyzed via thematic analysis techniques (Creswell, 2012). The findings from the focus groups were then used to inform the construction of a questionnaire survey. The Tailored Design Method

(TDM) as described by Dillman (2007) was utilized during questionnaire administration. Software packages to aid in data analysis included NVIVO 10 for qualitative thematic analysis and Statistical Package for the Social Sciences (SPSS v21.0). This chapter will serve to outline in detail the methodological approach followed in the study.

3.1 Focus Group Discussion Data Collection

Focus groups consist of a process of collecting data through interviews with groups of people (typically four to six) in which the researcher asks a small number of general questions and elicits responses from all individuals in the group (Creswell, 2012). Focus groups were used in this study to explore the perceptions of the continuing education needs and interests of MLT professionals in the province. Focus group questions (see Appendix G) were developed following a review of the literature and were structured to explore CPE topic areas both from an educational and health professional perspective. Questions were designed to be "open ended" (Creswell, 2012; Dillman, 2007) and were structured to explore the perspectives of focus group participants. Each focus group lasted approximately one hour and was recorded. Both groups were presented with the same set of open ended questions (see Appendix G).

Focus groups can be used to collect shared understanding from several individuals and gain views from specific people and can be advantageous in soliciting information (Creswell, 2012). According to Creswell (2012) the interaction among interviewees will likely yield the best information when interviewees are similar to and cooperative with each other. Focus group sessions were conducted during the 2012 annual NLCMLS

provincial congress. The location and timing of the focus group sessions were purposefully set to coincide with this event, so as to reduce observable barriers that are present through geography and work schedules of the MLT profession. It also served to create a homogenous sample of laboratory professionals. The NLCMLS provincial congress is an annual event hosted by the laboratory community of the province and serves to engage the MLT community in collaborative and educational activities as well as a formal annual general meeting of the society. Focus groups were scheduled during evening hours so as not to impact the NLCMLS schedule.

The focus groups consisted of a purposive sample of laboratory technologists from across Newfoundland and Labrador (NL). An invitation letter (see Appendix B & D) was provided to all congress delegates through their initial NLCMLS congress registration package (approximately 110), asking them to participate in one of two focus groups. The focus group A invitation (see Appendix B) was directed towards clinically practicing technical staff colloquially referred to as "bench" technologists or technical staff, while the focus group B invitation (see Appendix D) targeted other non-technical or supervisory technologists such as managers or educators.

3.2 Qualitative Analysis

Focus group discussions were transcribed and analyzed using thematic analysis (Creswell, 2012; Jupp, 2006). Data was transcribed from audio recording to Microsoft Word format which allowed for evaluation using NVIVO 10 qualitative analytical software. Thematic analysis consisted of a systematic process of examining the data for

prevailing themes. The first phase of this process was to utilize open coding of the data in which initial indicators (key words) of information surrounding prevailing themes were segmented from the transcripts (Creswell, 2012). These key words were then coded and developed into primary categories. These open categories were then used as the basis for comparison and contrast which was subsequently used to establish and merge categories representative of key themes emerging from the data. Selective coding was utilized in the last phase to evaluate interrelationship of the categories (Creswell, 2012). This selective coding identified key questions to be developed in the quantitative phase of the research and served as basis for instrument development. NVIVO 10 (QSR) was used to manage data analysis and served as a guide for in-depth analysis of prevailing themes. Chapter four summarizes the key themes and sub-categories that emerged from the qualitative analysis of the focus groups. Following focus group analysis and thematic emergence, a quantitative instrument was developed and submitted for ethical approval to be used for subsequent data collection.

3.3 Survey Questionnaire Development

Following the qualitative phase of the research, a questionnaire was developed using a combination of emergent data from the focus group research, and adapted items from an existing survey instrument that had been utilized by the Northern Ireland pharmacy community (Haughey, Hughes, Adair, & Bell, 2007). The final survey questionnaire included eight sections. Table 2 provides an overview of the associated survey sections. To further enhance validity, the instrument was reviewed by two senior

health science educators/researchers who provided feedback before the final survey was submitted for ethical review. The survey instrument predominantly utilized closed ended Likert scales (e.g., 1 = strongly disagree to 5 = strongly agree), check boxes and open ended questions.

Table 2 Quantitative Instrument Sections

Section Title	Section Structure
Demographic Information	• Demographics were collected to allow comparison and analysis of various groups including aspects of age, gender and area of work experience. The choice of demographic information to be collected was made following consultation of exiting literature on health professional continuing education as highlighted by Grant (2004a) and Curran (2011).
Attitudes towards CPE	• 11 Likert scaled questions relating to personal perspectives on CPE were proposed. Respondents were asked to indicate their agreement with proposed statements. Scale was adopted directly from: Haughey, S., Hughes, C., Adair, C., & Bell, H. (2007). Introducing a mandatory continuing professional development system: an evaluation of pharmacists' attitudes and experiences in Northern Ireland. *International journal of pharmacy practice* , 243-249.
CPE experiences	• A list of 4 Likert scale questions relating to the frequency in which respondents indicated their participation and experience with CPE. Respondents were asked to indicate their level of agreement with proposed statements. Secondly, a list of 8 Likert scales questions was proposed in which respondents indicated their level of agreement to various statements relating to CPE. Scale was adapted from: Haughey, S., Hughes, C., Adair, C., & Bell, H. (2007). Introducing a mandatory continuing professional development system: an evaluation of pharmacists' attitudes and experiences in Northern Ireland. *International journal of pharmacy practice* , 243-249.

Table 2 Quantitative Instrument Sections (continued)

Topics of Interest	• A list of 16 potential topic areas for future CPE was presented and respondents were asked to indicate how important each topic would be to them. These topics were identified through qualitative analysis and an additional section was in place for respondents to indicate topics not listed.
CPE Delivery Format	• A list of 11 potential CPE delivery formats was presented and respondents were asked to indicate their preference for each type of delivery. These topics were identified through literature review and qualitative results. An additional section was in place for respondents to indicate delivery methods not listed
Time of Delivery	• A checklist scale that allowed participants to indicate multiple responses was presented indicating their preferred time for participating in CPE. Participants were instructed to check all times that applied.
Barriers to Participation	• 8 Likert scaled questions relating to personal barriers to CPE proposed. Respondents were asked to indicate to what extent each barrier may have on their own CPE. Topics were identified through literature review and qualitative results.
Enablers to Participation	• 7 Likert scaled questions relating to personal enablers to CPE proposed. Respondents were asked to indicate to what extent each enabler may have on their own CPE. Topics were identified through literature review.

Following ethical review of the questionnaire, the survey was distributed to the laboratory technologists of the province using an electronic survey device.

The questionnaire survey was administrated and distributed to the potential respondent population through FluidSurveys.com during January and February of 2013.

FluidSurveys.com is an online survey creation tool that stores all its survey data in Canada (FluidSurveys, 2013). The survey (see Appendix H) was administered following the TDM (Dillman, 2007). Contact information was obtained through multiple sources (see Table 3), for laboratory technologists across the province which included a source list provided by the NLCHP registrar community email, employment email contacts, and personal contact information. Direct email contact information was obtained for 414 laboratory technologists across the province representing approximately 80% of total laboratory professionals within NL.

Table 3 Survey Distribution

RHA/Association	Method of URL Distribution
Newfoundland and Labrador Council of Health Professionals	• Distributed via e-mail to membership.
Newfoundland and Labrador College of Medical Laboratory Sciences	• Posted link on members only Facebook® page. • Distributed link via email to membership.
Central Health	• Distributed indirectly via regional manager of laboratory services
Eastern Health	• Distributed indirectly via regional manager of laboratory services
Western Health	• Distributed indirectly via regional manager of laboratory services
Labrador Grenfell	• Distributed indirectly via regional manager of laboratory services
College of the North Atlantic	• Distributed via Outlook (E-Mail)

As prescribed by the TDM (Dillman, 2007), an initial e-mail invitation was sent to laboratory professionals detailing the research (see Appendix F). After one week, a reminder e-mail invitation was sent to all contacts followed by a second e-mail invitation two weeks later. The NLCHP, NLCMLS and Regional Health Authorities (RHA's) were also approached and asked to forward the questionnaire to their contact lists. All survey responses were collected via FluidSurveys.com and downloaded as a MS Excel file which was subsequently transferred into the Statistical Package for the Social Sciences (SPSS v21.0) for analysis. Statistical analysis consisted of an evaluation of central tendency of responses as the initial and primary method of data analysis (Gravetter & Wallnau, 2010). Frequency analysis was utilized across all variables. Demographic variables were grouped in 10 year intervals for age and years of experience as well as the categorization of working areas of expertise (Argyrous, 2011; Muijs, 2011). Factor analysis was utilized to confirm the attitudinal scale from the instrument adopted from Haughey et al. (2007). Both Eigen values and Cronbach's alpha were used to establish internal reliability (Argyrous, 2011; Creswell, 2012). Kruskal-Wallis analysis was utilized to examine the relationship between respondents' background characteristics and attitudes towards CPE and other variables (Argyrous, 2011; Polgar & Thomas, 2008). An alpha level of 0.05 was utilized throughout data analysis.

Chapter three provides an overview of the methodology utilized during the research process. Chapter four will serve to highlight the data collected and provide an overview of the results obtained.

CHAPTER 4

RESULTS

The overall purpose of this study was to explore NL MLTs perceptions, attitudes, and CPE experiences, and to examine future topics of interest, preferred methods, and formats of CPE delivery. A mixed-method exploratory design was undertaken that included both qualitative and quantitative data collection components. In this chapter the findings from focus groups conducted with a purposive sample of NL MLTs and the results from an online survey of MLT respondents are summarized. The results of the first phase of the study are presented initially and summarize the analysis of qualitative data which was collected from the focus group research. The results of the focus group were utilized in the development of the quantitative survey questionnaire. The second phase of the study involved the administration of the survey-questionnaire and the results are summarized.

4.1 Summary of Focus Group Findings

Two focus group sessions were conducted during the 2012 NLCMLS provincial congress. Focus groups consisted of a purposive sample of laboratory technologists from across NL. A total of nine (n=9) participants engaged in the focus group discussions. All participants were CSMLS certified, general medical laboratory technologists; four were primarily employed in an urban setting and five reported primary employment in a rural setting. Three participants reported more than 20 years of experience, four reported 10-

20 years of experience, and two participants reported fewer than 10 years of experience. Employment experience included four bench level technologists engaged in primarily patient oriented testing, three senior technologists engaged in management and supervisory duties, and two technologists from educational institutions. Seven participants were female while two were male.

The focus groups were recorded, transcribed, and analyzed using thematic analysis (Creswell, 2012) and a number of thematic categories emerged. Table 4 summarizes the key themes and sub-categories that emerged from the qualitative analysis of the focus groups.

Table 4 Thematic Summary Analyses

Emergent Thematic Category	Sub-Categories
Lack of Awareness	Employees unaware of CPE options Employees unaware of CPE providers
Increased Desire for CPE	Increased desire from employer Increased demand by employee Changing work dynamics
Attitudes Toward CPE	Apathy towards and unwillingness to engage in CPE Lack of perceived benefit Interest in participation Impact of licensing

Table 4 Thematic Summary Analyses (continued)

Enablers of CPE Participation	Perceived consideration for advancement Changing career dynamic Perceived intrinsic benefits Union impact Increased impact of quality control policies
Barriers to Participation	Personal barriers Employment barriers Geographic remoteness Overcoming barriers Staff shortages Financial barriers
Impact of Changing Work Environment	Technological change Ontario Laboratory Accreditation initiative
Types of CPE	Degree completion Other formal courses Mentorship Networking
Providers of CPE	Employer funded Provincial society
Characteristics of CPE	Credential
CPE Topics	Lab specific material Technology Quality control Education

The following discussion summarizes the results of the analyses of the focus groups. Each theme is defined and a summary of selected representative quotations are presented to highlight the nature of the theme. The thematic analysis findings were subsequently utilized to inform the survey questionnaire during in the second phase of the mixed-methods study.

Lack of Awareness

A thematic category regarding a perceived lack of awareness of CPE opportunities and available options throughout the province emerged from the focus group discussion. This lack of awareness incorporated elements of uncertainty regarding available CPE options, as well as confusion regarding regulatory requirements and what constituted CPE. All nine participants indicated a level of uncertainty regarding CPE options, whether from their own perspective or from their peers.

> *"I think there are a lot of opportunities out there for continuing education, but it is knowing where to get continuing education."*
>
> *"I am after telling a lot of people, but a lot of people are still...are like well when are we supposed to get our education credits or how can we get it."*
>
> *"A lot of people don't...you know, where to go and find the information that they are looking for."*

Additionally, some focus group participants indicated that their peers were unsure as to what they should be doing to maintain their CPE credits as mandated by the regulatory requirements. That is, technologists were unaware of the details associated with what constituted acceptable CPE to maintain their professional certification.

"They don't know what to do."

"Most people think that it's just through the society or through CAP [Canadian Association of Pathologists]."

It is worth noting that the CPE credit system proposed by the NLCMLS had only recently been finalized during the NLCMLS annual general meeting and came into effect officially on October 5th 2012, with the proclamation of licensing for the profession. It is possible that a lack of awareness may decrease with time due to mandated increase in CPE activities across the profession.

Increased Desire for CPE

A thematic category relating to increased desire for CPE also emerged from the analysis. This increased desire for CPE included perspectives relating to desire from the employee, demand from the employer, and a general expectation for CPE due to changing industry dynamics. A strong sub-theme also emerged pertaining to an increased desire and expectation for CPE participation within the health care sector of the province from both the employee and employer perspective:

"One of the things that they said, this is one goal of being manager, in order to be trained in micro they wanted you to do this refresher course offered by Michener."

"As for the employer, I mean the employers want you to do [CPE], but this is the prime example, they are not going to give you any time to do it they are not giving you any finances to do it."

"It is you know...and I mean even on the employer aspect, like in [omitted], they are always saying, like you know avail of these situations, these seminars and the

grand rounds that we have on Tuesdays and stuff."

Additionally, an increased expectation for available CPE emerged from the perspective of the employee given recent changes in provincial regulation. This fact was very clear throughout focus group discussion and was discussed by all participants.

"Well licensing now, you got to have your education credits."

"Yeah, cause that's the main incentive for the most part now."

Attitudes toward CPE

Perhaps one of the more interesting thematic topics that emerged throughout the data was a mixed attitude surrounding CPE. Perspectives were broad, varied, and included elements of apathy, unwillingness, and perceived lack of benefit, but also expressions of interest and expectation due to licensing. Historically, there has been a limited amount of mandated CPE within clinical laboratory environments and all but one participant acknowledged the presence of a somewhat skeptical perception of CPE across the MLT community.

"They don't want to have to do it; they don't think they should have to do it."

"Yeah, well I just know from the younger generation in my hospital they are at the point where it's like well, why bother, why do anything...you know what I mean? They don't see any benefit for doing anything."

"Well I think that I sort of alluded to it in my previous comment that not everybody is buying into it at the same level. And I think there is some resistance out there."

There were also positive perceptions of the importance of CPE. Focus group participants viewed recent changes in mandating CPE as those which were likely to have a positive impact on the MLT profession in the province. Two participants clearly indicated an expected increase in CPE activity as a result of licensing and regulation.

> *"But people are wanting to participate more in the teleconferences that they are doing in the provincial medical rounds... that we are doing every Tuesday ...like people are going to those now, because of the credits."*
>
> *"I think people are taking a lot more initiatives towards continuing education since CE [continuing education] has become regulated."*

Participants also indicated that laboratory technologists throughout the province appeared to be more interested in participation in CPE activities and reported observations of an improvement in the skeptical attitudes that had existed historically. One participant related very positively to the changing CPE atmosphere within clinical laboratories of the province.

> *"I think that it's improving. It was in a sad state I would say preceding the last two years. But it's getting there and hopefully it will get a lot better in years to come."*
>
> *"Exactly, you gotta work for it... and even like I can hear like...even from the bench techs now...it's like this one is enrolled in the quality assurance...and it's like...oh go on....and I found out the other day that there was three people in Gander doing this quality assurance program.... Like that would never have happened before."*

Barriers to Participation

Barriers to participation also emerged as a key theme from the focus group discussions. These barriers included: time, financial constraints, geographical

limitations, employer limitations, and staffing shortages. All participants elaborated to some extent on the impact that a lack of time was having on either their own or their colleagues' ability to pursue CPE as demonstrated in the following comments:

> *"Time is the issue, cause I have mentioned to some of the staff in [omitted location] that they have to start doing them and they said there is not time enough in our day to do them and I have said, NO you have to do them on your own time. The look was like what?"*
>
> *"And just doing education at home, like your own online stuff, if you had a busy busy busy job like that, you didn't have any downtime at work, when you get home you're not going to want to be doing a course for hours and reading. It don't sink in first of all."*
>
> *"But one thing I am finding is... people think that oh no...I don't have time... I have three kids...and you know...I am working shift work....how am I going to do course work?"*

While time appeared to be a major factor, it was also apparent that financial barriers were clearly impacting perceptions of CPE. Financial barriers were largely attributed to a lack of support from employers.

> *"As for the employer, I mean the employers want you to do but this is the prime example, they are not going to give you any time to do it they are not giving you any finances to do it."*
>
> *"Ok, for finance, like for this, it's on your own nickel and dime. Everyone can't afford to come to this, like we said there are a lot of single parents out there who can't come because if they got their babysitter and travel out of town and then you have hotels, we have the registration, with all of this you're looking at like a 600 dollar bill."*

References to a lack of employer support emerged on several instances. Two focus group participants were currently employed within the education sector, though notably, each

had also previously been employed in a clinical laboratory environment. During the focus group discussion a sub-category of educational sector support emerged and it was suggested that CPE was strongly supported by the educational employer.

> *"I have been there at [education employer] for a while but it... I... there have always been opportunities there if you wanted to pursue it. I guess being an educational institute...if I have... I have gone and done CPE every year since I have been there."*

In contrast to the apparent support that was observed within the education sector participants indicated a lack of support from the health care sector. This was reported by the majority of focus group participants. Two primary sub-categories emerged relating to a lack of health care sector support of CPE. The first of which was a perceived lack of direct financial support from health authorities.

> *"They don't really support it, they want you to do it but they're not going to support you in doing it. Like I say another thing is the congress. They are not giving you the finances; they are not giving you the time."*

> *"You know if you want to go, you can go...you can take your education leave...up until now this year...but you can take your education leave and go to it, but pay your own way."*

Secondly, there appeared to be a perceived lack of general support from the health authorities for CPE within the MLT community. Though one participant indicated that she was able to take time off for examinations, the discussion indicated a lack of non-monetary as well as monetary support from health care employers.

> *"They told us that if they were going to give education leave that you couldn't be replaced, so you couldn't be working in somewhere you needed to be replaced.*

So now that we needed to take vacation to come that we got replaced as they called in our casuals to replace us, cause we are on vacation."

"[Omitted employer] was basically the same way, people wanted to go, couldn't get time off for it. I know there was two people in histology that wanted to go, they couldn't go because if they had to go, someone was going to have to replace them, and they weren't going to do that, they didn't want any replacement at all."

Participants also indicated that geographical constraints existed within the province. The rural and remote geography of the province emerged as a major barrier for participation in CPE. It was also highlighted that technologists within Labrador were potentially at a further disadvantage.

"I know that a big barrier like [Name omitted] coming from [rural location] that alone, that's gotta wear you out, we have had people in the past coming from Corner Brook; we have had people in the past come from St. Anthony to Labrador."

"I think that our geography in this provinces works negative... you know it is a negative impact and I think that's both for the [omitted employer] with all its [locations] scattered around, and hospitals."

A sub-category of general staff shortages throughout the MLT community was apparent. This staff shortage however appeared to be limited to clinical laboratory environments and was not observed to be present within educational or other environments.

"None of them could even [attend the congress] if they wanted to come, couldn't go for anything, right, because of staffing issues."

"Don't have the casuals to replace the people to go and do education."

"But sometimes with staff shortages and things like that what we got now...and everybody is facing that...that we don't have extra people."

Enablers of CPE Participation

Enablers to participation in CPE also emerged as a thematic category from the focus group analysis. The findings suggest that incentives to participate in CPE activities are significant and that MLTs feel that participation in CPE is a worthwhile endeavour. All participants indicated that they and their peers perceive a changing work dynamic where increased CPE will likely play a critical role in career advancement and help compensate for shifts in working dynamics of the profession. Three sub-themes emerged from the analysis including a perceived consideration for advancement, a need to maintain a license, and changing career dynamic focussing on new methodology.

> *"[Manager] considers you for higher positions if you are better educated, which means a degree."*
>
> *"And they know in order to get these jobs from now on you gotta have these courses, so... and the incentive is there to get the Monday to Friday job....like to me that is the incentive, but in order to get it you gotta have these courses."*

While traditional advancement appeared to be a major consideration given recent changes in license requirements, it must be noted that any traditional advancement within the direct clinical laboratory setting, will invariably require a professional license (e.g., tech II, tech III or coordinators). This concept was clearly apparent throughout the discussion.

> *"I think people are taking a lot more initiatives towards continuing education since continuing education has become regulated."*
>
> *"And I think it will change, because now where it's a part of the continuing education, whereas even up to a month ago when we had to get the license, you could hear people talk about it....oh you gotta do the education, gotta do the education."*

In addition to licensing requirements, participants indicated that alterations in work conditions or changing scope of practice have begun to play a significant role in the health care sector.

> *"If you are out of a department for a month...you're lost, because there is so much change within that month, you have to go and retrain in that department."*
>
> *"I know at [employer omitted] now even like to apply for any type of positions, and I know for my position as [position omitted], now I have to do the three quality system courses and I have to do a 12 course certificate and things like that."*
>
> *"Um like, technologically we have to do way more in the lab now when you get any new technology, from the training to the validating to the correlating."*

While there appeared to be a substantial argument made for the utilization of CPE as a means of career advancement, it was also apparent that opposing perceptions may exist. Two participants indicated that their own high level positions had been obtained with no consideration of CPE by the employer, and additionally, entry level practice participants openly put forth a personal perception of no incentive what so ever, in regards to the role of CPE in career advancement.

> *"But having said that, once you are as far as you can go....you know what I mean...there is no incentive."*
>
> *"I mean if you...if you're a tech three or something like that, like say one of those quality people who are tech three's. There's...that's the worst thing about it....like even a nurse can go on and do her master's and make more money....right....but there is no incentive in a lab tech."*
>
> *"Yeah....and that is one thing...everyone thinks well it's not gonna make me any more money if I go get my bachelor of technology and things like that."*

Notably there was also some indication of perceived intrinsic benefit, by focus group participants who noted the following when discussing reasons to participate in CPE:

> *"Keep yourself on top of the game, cause if you don't do it, it's easy to slip into that easy mode."*
>
> *"Personal advancement"*

The financial burden associated with CPE participation carried significant weight from the perspective of the participant. From an employee perspective it was felt that the employer should financially contribute to CPE participation for their staff. Given the relative frequency of funding concerns that emerged throughout focus group discussion, an additional sub-category of overcoming barriers also emerged. As would be expected, increasing funding made available to MLTs within the province was an emergent theme.

> *"You know like, it's like they will only offer the money that they already have and unless it suits their needs. And you got people who are doing continuing education and they won't throw them a dime. And that's frustrating."*
>
> *"Employers should offer time, offer time and money for it."*
>
> *"Well yes like I say, a lot of my friends are teachers and three of them just went on and finished their master's in education. So, and the incentive there was they wanted to boost up their pension before they retire. But I mean that has none.... that's not even an option for us."*

Some participants indicated and agreed that standardization or alteration of CPE policies could prove financially beneficial.

> *"I think, provincial standardization of policies and procedures as much as possible, I mean why duplicate and reinvent the wheel in four different health authorities when everything can be done or a lot of things can be done at one*

standard site and then everybody is on the same page."

"That could affect it because if everybody is on the same page then it's much easier to offer a course that everybody could participate in and it's easier to go to government to get funding."

Overcoming time barriers was an additional sub-category that emerged. Time was a major barrier for many MLTs both from an employer perspective, as it may relate to demand from staff shortages, as well as from an employee perspective in relation to personal time commitment associated with CPE participation. All participants indicated that a lack of time was a primary barrier and offered a number of possible solutions.

"You don't want to have a certain time now that you got to have this done cause if you got a family; you got things to do when you go home. You only got a certain amount of time... after working all day dealing with your family there is only a certain amount of time."

"More distance online courses made available. Like I know, like your B.Tech is on distance education, but like if you could get other bachelor programs. Like I think a lot more people would do it knowing that they could go home and do a course as opposed to leaving work."

"But what it was to put webinars and anything that goes on that we can possibly record to put on there that might be helpful to somebody up in Labrador that can't attend and, and we can put probably lectures from our provincial congress on to it and things like that, and members can log in and I think things like that will be very helpful."

Impact of Changing Work Environment

One of the more predominant themes that emerged was the impact that a changing work dynamic was creating. All participants indicated that recent changes in external laboratory accreditation and the resultant increase in Quality Control (QC) protocols has played a significant role in altering perspectives on CPE. Changing work environment

included aspects of technological change, increased documentation, and increased demand for laboratory results.

> *"If you are out of a department for a month...you're lost, because there is so much change within that month, you have to go and retrain in that department."*
>
> *"And like, you got all the young ones coming out saying, OK well this is what's going on now... you're thinking, where did that come from, I never heard tell of that and then it's like....ok now I got to do courses."*
>
> *"Yeah, well I found that training new staff like in [omitted], and you're training all the new staff, and yes its great and I was experienced and used my experience to train them and whatever....but then they are talking about things and I am thinking....oh!.... and you know...I am training you but in reality, you're training me on things that we never did."*

While increased change in work environment was apparent, the impact OLA was also identified in the discussion. The OLA process was introduced by employers following the recommendations from the CIHRT, as described previously, and was a province-wide initiative.

> *"And I think you know the whole going through the [OLA] accreditation process have certainly got people you know on board with you know learning as much as they can, and keeping on top of things."*
>
> *"You know until we had OLA, I never read the CSTM standards...right...but I know them now."*
>
> *"OLA, OLA got all these standards that as a lab, we got to operate by, so a lot of us had to change our practices."*

Intertwined within the OLA sub-category was the impact that new QC protocols seemed to be having on the CPE of MLTs within the province. Much of the OLA initiative revolved around QC alteration and evaluation of QC protocol. All participants agreed

that QC from the employer was altering the expectations for CPE in the workplace.

> *"And the quality assurance, quality control programs now that, like broad, it's so mainstream, everything revolves around that now and everybody is trying to learn more about those and everybody is trying to like..."*

> *"Well when OLA came through our area, we had to, they said we had to start using [Westguard] [QC]rules....which makes sense but a lot of people, a lot of the older people had no idea what Westguard rules were."*

> *"I think like, things that you lead to a certification, the quality assurance courses where you do three of them and then you get a certificate in quality assurance... I think that, that's good."*

Types of CPE

Types of CPE also emerged as a key category. While it was clear that licensing has impacted the practices involved with CPE participation, there also appears to be an impact regarding the type of CPE and topics of choice. Degree based programs and other formal learning activities emerged as important types of CPE for MLTs in the province. Approximately half of the participants indicated that they had either completed or begun a baccalaureate degree as a form of CPE. Others indicated they had participated in a formal learning format such as those courses offered by the CSMLS, Canadian Association of Pathologist (CAP) or other outside agencies. Additionally, there was substantial discussion surrounding a common baccalaureate degree found within NL known as the Bachelor of Technology offered through Memorial University.

> *"Before they decided to go into the workplace. Like that's the key place to get them to say you know you guys can continue your education a little while longer and you can come out with a degree."*

> *"[Omitted] wants it, that you cannot be advanced, like you cannot be a tech III or a manager without a degree."*

While reference to baccalaureate degrees was apparent, additional forms of formal structured learning were also discussed.

> *"The lectures alone, just coming to the lectures, you learn a lot."*
>
> *"Well that's why I thought the refresher courses were so great.....and I mean they are offered for more than just micro....I mean there is a refresher course offered by CSMLS for pretty much everything."*

While formal learning appeared to dominate discussion of the types of CPE that MLT professionals were seeking, a subcategory that emerged related to informal types of CPE. Mentorship and the perceived benefits of increased social networking were discussed and participants agreed that informal learning such as this were of significant value from a CPE perspective.

> *"So the ones that came back were responsible for teaching the rest of you."*
>
> *"Socials alone you talk back and forth to one another, you learn things from each other. Right...not only just going to the lectures, between yourself, say you."*
>
> *"It's constant education, you got to learn it and learn it and then you got to bring it back pass it on to someone else, teach them how to use it."*

Providers of CPE

Providers of CPE emerged as a key thematic category. Participants envisioned employer-sponsored CPE as an important source for CPE activity as opposed to self-directed or self-funded approaches. Additionally, a greater responsibility appeared to be placed on the professional society, the NLCMLS. Participants agreed that increased CPE

options should be considered by the professional society.

> *"Our symposiums, right that's gonna be a big thing....that's a good thing."*
>
> *"And our local society. Like you know like with the.....symposiums."*

It was also indicated that a perception exists that the national society has a greater role to play in the offering of quality CPE programming.

Characteristics of CPE

Focus group participants discussed the characteristics of CPE that they felt would be most preferred. A sub-theme of credentialing emerged from the discussion. Five participants discussed additional forms of credentialing beyond baccalaureate degree completion. Participants indicated a desire for formal CPE options leading to alternate credentials including quality assurance based courses and subsequent rewards. All participants agreed that credentialing may be an attractive option for CPE.

> *"But I think the rewards should reflect what efforts you are putting into it... so I think the certificates are great if you're being tested but I think there should be the option that you can to do courses to get credit without being tested as well."*
>
> *"Well that's why I though the refresher courses were so great.....and I mean they are offered for more than just micro....I mean there is a refresher course offered by CSMLS for pretty much everything."*

CPE Topics

A final thematic category emerged relating to the topics of most appeal or desire. There were a substantial number of select topics indicated, ranging from those of interprofessional education, word processing, and even adult education, yet it was agreed

by all participants that CPE topics should be largely laboratory specific. The types of topics that emerged ranged from special clinical knowledge, to quality control, and additional training in modern computer technology to cope with a changing work dynamic.

> *"We should be doing what we are doing on the bench; we should be learning the better techniques, the new technology that's coming."*
>
> *"And better ways of doing what we already do. Not business courses.... Not business courses. I am doing my B.Tech and you do economics and religion."*
>
> *"But sometimes it's the basic ones like you say; how to write a policy, how to do occurrence reporting."*

4.2 Summary of Survey Findings

A total of 178 survey responses were received and of these, 155 were submitted as being complete and utilized for statistical analysis. Non-submitted responses were recorded but due to the potential for errors in completion (i.e., browser lock or error), these responses were omitted. Survey responses that indicated a single missing variable, but were submitted, were included in the analyses.

Surveys were distributed electronically to 414 NL medical laboratory professionals. The total number of licensed medical laboratory professionals was approximately 517 at the time of survey completion (NLCHP, 2013a). Direct email contact information was unavailable or not made available for 103 licensed laboratory professionals. One hundred and fifty five (n=155) completed responses were submitted of a total provincial MLT population of 517 resulting in a response rate of 30%.

Demographic characteristics of respondents were compared against existing data

obtained from the NLCHP official roster, CSMLS official roster and the CIHI statistical database, in conjunction with prior demographic research (CIHI, 2011; CSMLS, 2013a; Keeping, 2000; NLCHP, 2013a). Table 5 summarizes the demographic characteristics of the survey respondent sample as compared with the actual characteristics of both the current Canadian population, and historical information relating to the provincial population. The majority of survey respondents (85.8%) were female, 42.5% indicated 21 years or more experience and the majority (65.1%) reported their age was between 31 and 50.

Table 5 Respondent Demographics

	Sample N (%)	NL Estimate (1999)*	Canada Estimate (2011)**
Age			
≤30	21 (13.6%)	14%	
31-40	50 (32.2%)	34%	
41-50	51 (32.9%)	45%	
>50	32 (20.6%)	10%	
Not Indicated	1 (0.6%)		
<35			21.6%
35-54			54.4%
>55			23.9%

Table 5 Respondent Demographics (continued)

Years of Experience			
0-10 years	48 (31.0%)		
11-20 Years	40 (25.9%)		
≥21 Years	66 (42.5%)		
Not Indicated	1 (0.6%)		
Gender			
Male	22 (14.6%)	30%	14.2%
Female	133 (85.4%)	70%	85.8%

* (Keeping, 2000)
** (CIHI, 2011)

The majority of respondents (62.6%) reported working in a community that was primarily urban in nature (population >10,000), whereas 35% indicated that their primary work location was in a rural setting (population <10,000). The majority of respondents (61.3%) also indicated that their primary work location was in the eastern region of the province and were full time permanent employees (87.7%). Table 6 summarizes respondents' primary area of employment expertise. The majority of respondents (65.2%) indicated expertise in at least one of the areas of clinical chemistry/biochemistry, hematology/hematopathology or transfusion medicine/HLA which represent the largest

employment area in medical laboratory technology. Approximately 18.2% indicated employment in non-clinical areas of management or education.

Table 6 Area of Employment Expertise

Area of Employment Expertise	N (%)*
Clinical Chemistry/Biochemistry	70 (45.2%)
Hematology/Hematopathology	69 (44.5%)
Transfusion Medicine/HLA	53 (34.2%)
Microbiology/Virology/Mycology	21 (13.5%)
Education	10 (6.5%)
Histology/Pathology/Histotechnology	9 (5.8%)
Cytology/Genetics	9 (5.8%)
Other	7 (4.5%)
Not Indicated	1 (0.6%)

*Respondents could indicate more than one area.

Table 7 summarizes respondents' agreement with a number of items pertaining to attitudes towards CPE. The results suggest an overall positive attitude towards the importance of CPE to the MLT profession. Ninety seven percent (97%) of surveyed technologists either agreed or strongly agreed that CPE is essential for practicing MLTs and 94% agreed or strongly agreed that CPE is a beneficial use of a MLTs time. Eighty

three percent (83%) indicated that the implementation of CPE would ensure higher quality patient care and 94% percent of respondents agreed that CPE was an excellent means by which MLTs could upgrade their professional knowledge and skills. Attitudinal scores towards the characteristics of a CPE system were somewhat lower. Fifty five percent (55%) of survey respondents agreed that MLTs should undertake 30 hours of CPE per year, while 33% neither agreed nor disagreed. Additionally, only 44% of respondents felt that MLTs who fail to engage in CPE would fall below the required standard of professional competence and approximately one third of respondents (36%) disagreed or strongly disagreed that they were provided with sufficient CPE concept training.

Factor analysis was conducted combining Likert items from the CPE attitudinal section of the survey. Table 8 provides original factor analysis indicating two factors with Eigen values greater than one and indicates factor analysis following the extraction of two components.

Table 7 Attitudes towards CPE

Variables	N	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree	Mean	SD
It is essential for all practicing MLTs to engage in CPE.	154	0 (0%)	2 (1.3%)	3 (1.9%)	63 (41%)	86 (56%)	4.5	0.61
CPE is a beneficial use of an MLTs time.	155	0 (0%)	4 (2.6%)	6 (3.9%)	76 (49%)	69 (45%)	4.4	0.68
The implementation of CPE would ensure a higher quality of patient care.	155	0 (0%)	7 (4.5%)	19 (12.3%)	64 (41%)	65 (42%)	4.2	0.83
CPE is an excellent means by which MLTs can update their professional knowledge and skills.	154	0 (0%)	1 (0.6%)	8 (5.2%)	66 (43%)	79 (51%)	4.4	0.63
MLTs should routinely keep a CPE portfolio which provides evidence of their professional competence.	155	0 (0%)	9 (5.8%)	14 (9.0%)	64 (41%)	68 (44%)	4.2	0.84
It should be mandatory for MLTs to undertake 30 hours of CPE per year.	155	3 (1.9%)	28 (18%)	39 (25%)	56 (36%)	29 (19%)	3.5	1.05
MLTs who fail to engage in CPE will fall below the required standard of professional competence.	155	3 (1.9%)	32 (21%)	51 (33%)	42 (27%)	27 (17%)	3.4	1.05

Table 7 Attitudes towards CPE (continued)

I have been provided with sufficient information and training about the concept of CPE.	155	8 (5.2%)	48 (31%)	31 (20%)	50 (32%)	18 (12%)	3.1	1.14
Engaging in CPE will make MLTs more confident and professional in their approach to patients.	155	0 (0%)	15 (9.7%)	30 (19%)	68 (44%)	42 (27%)	3.9	0.92
MLTs must make sufficient time to engage in CPE.	154	5 (3.2%)	17 (11%)	31 (20%)	40 (26%)	61 (40%)	3.7	1.07
CPE should be undertaken by MLTs without additional payment.	155	18 (12%)	23 (15%)	38 (25%)	40 (26%)	36 (23%)	3.3	1.30

Table 8 **Factor Analysis for CPE Attitudinal scale**

Component	11 Variable Factor Analysis Initial Eigen values			9 Variable Factor Analysis Initial Eigen values		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.728*	52.071	52.071	5.380*	59.775	57.778
2	1.186*	10.780	62.851	.939	10.434	70.209
3	.880	8.001	70.851	.681	7.564	77.773
4	.718	6.531	77.383	.438	4.862	82.635
5	.568	5.166	82.549	.398	4.427	87.062
6	.393	3.569	86.117	.364	4.048	91.110
7	.384	3.489	89.606	.302	3.353	94.463
8	.356	3.236	92.842	.282	3.134	97.597
9	.298	2.710	95.552	.216	2.403	100.00
10	.278	2.526	98.078			
11	.211	1.922	100.000			

Subsequent analysis indicated the removal of two variables created a single factor with Eigen values greater than one. Cronbach's alpha of 0.90 was calculated for the nine item

scale indicating strong internal consistency (Argyrous, 2011). A Kruskal-Wallis ANOVA comparing the interaction of age, gender, years of experience and community size with the CPE attitudinal scale was undertaken. Respondents aged 40 and under reported significantly lower CPE attitudinal scores ($M = 3.74$, $p < .05$, $df = 3$) than respondents aged 50 years or greater (see Table 9). Respondents with greater than 20 years of experience also reported significantly higher attitudinal scores than those reporting less than 20 years of experience ($M - 4.23$, $p < .05$, $df = 2$) (see Table 10).

Table 9 **Kruskal-Wallis ANOVA for Attitudes scale vs. Age**

	<30			**31-40**			**41-50**			**>50**			**Kruskal-Wallis**	
Variables	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**	**df**	**Sig**
Attitudes	21	3.7	.77	48	3.9	.60	48	4.1	.70	31	4.3	.45	3	.028*
	21	3.7	.77	48	3.9	.60	-	-	-	-	-	-	1	.601
	21	3.7	.77	-	-	-	48	4.1	.70	-	-	-	1	.094
	21	3.7	.77	-	-	-	-	-	-	31	4.3	.45	1	.009*
	-	-	-	48	3.9	.60	48	4.1	.70	-	-	-	1	.206
	-	-	-	48	3.9	.60	-	-	-	31	4.3	.45	1	.008*
	-	-	-	-	-	-	48	4.1	.70	31	4.3	.45	1	.314

Table 10 Kruskal-Wallis ANOVA for Attitudes scale vs. Years of Experience

	<10			11-20			>20			Kruskal-Wallis	
Variables	N	Mean	SD	N	Mean	SD	N	Mean	SD	df	Sig
Attitudes	48	3.9	.72	38	3.9	.58	65	4.2	.60	2	.005*
	48	3.9	.72	38	3.9	.58	-	-	-	1	.997
	48	3.9	.72	-	-	-	65	4.2	.60	1	.006*
	-	-	-	38	3.9	.58	65	4.2	.60	1	.006*

Table 11 summarizes the nature of CPE participation by respondents in the 12 months preceding completion of the survey. A majority of respondents (56%) indicated that they had frequently or always engaged in some form of CPE within the previous year and 54% indicated that they had frequently or always maintained a CPE portfolio.

Table 11 Level of CPE Participation

	N	Never	Rarely	Sometimes	Frequently	Always	Mean	SD
Participated in some type of CPE.	153	5 (3.3%)	10 (6.5%)	52 (34%)	57 (37%)	29 (19%)	3.6	.97
Identified my own learning needs.	153	5 (3.3%)	15 (9.7%)	70 (45%)	41 (27%)	22 (14%)	3.4	.96
Maintained a CPE portfolio which provides evidence of my professional development.	153	16 (10%)	23 (15%)	31 (20%)	42 (27%)	41 (27%)	3.5	1.3
Evaluated the progress I have made with my CPE	153	26 (17%)	40 (26%)	52 (34%)	25 (16%)	10 (6.5%)	2.7	1.1

Table 12 summarizes respondents' preferences and perspectives on CPE types. A majority (87%) of respondents reported that that they understood the concept of CPE and indicated that credentialing of some sort was important to them during selection of CPE (64%). Informal activities were also seen as important forms of CPE with 84% of respondents agreeing or strongly agreeing that mentoring was a useful approach for CPE. Interprofessional education (IPE), defined as learning with, from, and about other health professions (Health Professions Networks, 2010) was rated by a majority (72%) of respondents to be an important approach to learning. Tables 13 and 14 highlight the significant findings from Kruskal-Wallis ANOVA analyses, comparing the relationship

of CPE perspective items across demographic characteristics of age, years of experience, gender, and community size for those variables that demonstrated a statistically significant difference. Respondents aged 30 years or less reported less favorable perceptions ($M = 2.8$, $p<.05$, $df = 1$) towards "sanctions for MLTs who did not meet CPE requirements" versus respondents aged 50 years or more ($M = 3.6$, $p<.05$, $df = 1$). Respondents with less than 10 years of experience reported lower agreement than those with 20 years or more experience with "sanctions for MLTs who did not meet CPE requirements" ($M = 3.1$ vs. $M = 3.5$, $p <.05$, $df = 1$). Additionally, respondents reporting 20 years of experience or less also reported lower agreement than those with 20 years of more experience with "the concept of CPE was understood" ($M = 3.7$ vs. $M = 4.0$, $p < .05$, $df = 1$).

Table 12 CPE Perspectives and preferences

Variables	N	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree	Mean	SD
I completely understand the concept of CPE.	155	3 (1.9%)	17 (11%)	17 (11%)	88 (57%)	30 (30%)	3.8	.94
There should be sanctions for MLTs who do not meet their CPE requirements.	155	3 (1.9%)	25 (16%)	64 (41%)	47 (30%)	16 (10%)	3.3	.93
Obtaining a credential/certificate other than my professional license is important when I select CPE activities.	155	0 (0%)	17 (11%)	39 (25%)	85 (55%)	14 (9.0%)	3.6	.80
Mentoring activities, where one learns from more senior colleagues in the workplace, is a useful approach for CPE.	155	1 (<1%)	9 (6%)	15 (10%)	99 (64%)	31 (20%)	4.0	.77
Networking with other laboratory professionals is an important part of CPE.	155	1 (<1%)	3 (1.9%)	21 (14%)	96 (62%)	34 (22%)	4.0	.70
I prefer to obtain my CPE credits through provincial or national congress activities.	153	5 (3.3%)	40 (26%)	65 (42%)	34 (22%)	9 (5.9%)	3.0	.92
I prefer CPE activities that lead towards a baccalaureate degree.	155	5 (3.2%)	37 (24%)	64 (41%)	32 (21%)	17 (11%)	3.1	1.0

Table 12 CPE Perspectives and preferences (continued)

Inter professional approaches to learning are important to me.	155	0 (0%)	8 (5.2%)	36 (23%)	90 (58%)	21 (14%)	3.8	.73

Table 13 **Experience Item Mean Score by Age**

	<30			31-40			41-50			>50			Kruskal-Wallis	
	N	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**	**df**	**Sig**
Sanctions	21	2.8	.91	50	3.4	.92	51	3.3	.97	32	3.6	.71	3	.041
	21	2.8	.91	50	3.4	.92	-	-	-	-	-	-	1	.066
	21	2.8	.91	-	-	-	51	3.3	.97	-	-	-	1	.094
	21	2.8	.91	-	-	-	-	-	-	32	3.6	.71	1	.004*
	-	-	-	50	3.4	.92	51	3.3	.97	-	-	-	1	.857
	-	-	-	50	3.4	.92	-	-	-	32	3.6	.71	1	.143
	-	-	-	-	-	-	51	3.3	.97	32	3.6	.71	1	.111

Table 14 **Experience Item Mean Score by Years of Experience**

	<10			11-20			>20			Kruskal-Wallis	
Variables	N	Mean	SD	N	Mean	SD	N	Mean	SD	df	Sig
Concept	48	3.7	.95	40	3.7	.95	66	4.0	.90	2	.034
	48	3.7	.95	40	3.7	.95	-	-	-	1	.974
	48	3.7	.95	-	-	-	66	4.0	.90	1	.029*
	-	-	-	40	3.7	.95	66	4.0	.90	1	.031*
Sanctions	48	3.1	.94	40	3.3	.93	66	3.5	.85	2	.019
	48	3.1	.94	40	3.3	.93	-	-	-	1	.374
	48	3.1	.94	-	-	-	66	3.5	.85	1	.006*
	-	-	-	40	3.3	.93	66	3.5	.85	1	.095

Table 15 summarizes respondents' preferences for CPE topics relevant to the MLT profession in the province. The topics included in the survey-questionnaire were identified through a literature review and the findings from the focus group discussion. Quality Control/Quality Management was identified as one of the most important topics with 91% of respondents indicating that it was either important or very important. Eighty one percent (81%) of participants also indicated that basic laboratory skills were important or very important. Respondents were also provided with a category consisting of "other", and additional topics of interest noted by respondents, included such areas as "genetics" and "new technology" as well as "laboratory information systems".

Non-technical duties were also explored relating to concepts of teaching, office technology, report writing, time and conflict management, supervisory and leadership skills, budgeting, and interprofessional education. Figure 1 provides the survey responses relating to these non-technical areas and their relative importance to survey respondents.

Table 15 Perspectives on CPE topics

	N	Not Important At All	Less Important	Unsure	Important	Very Important	Mean	SD
Quality Control/Quality Management	155	0 (0%)	10 (6.5%)	4 (2.6%)	66 (43%)	75 (48%)	4.3	.81
Basic Laboratory Skills	154	5 (3.2%)	21 (14%)	4 (2.6%)	69 (45%)	55 (36%)	4.0	1.1
Time Management	155	1 (<1%)	22 (14%)	15 (10%)	86 (56%)	31 (20%)	3.8	.94
Supervisory/Leadership Skills	155	0 (0%)	27 (17%)	18 (12%)	75 (48%)	35 (23%)	3.8	.99
Interprofessional Education	150	1 (<1%)	23 (15%)	26 (17%)	76 (51%)	24 (16%)	3.7	.95
Transfusion Science	152	18 (12%)	35 (23%)	9 (5.9%)	54 (36%)	36 (24%)	3.7	1.4
Office Technology (e.g. Microsoft Word, PowerPoint)	155	4 (2.6%)	36 (23%)	10 (6.5%)	78 (50%)	27 (17%)	3.6	1.1

Table 15 Perspectives on CPE topics (continued)

Conflict Management	153	4 (2.6%)	25 (16%)	26 (17%)	71 (46%)	26 (17%)	3.6	1.0
Teaching/Education (e.g. how to teach/supervise students)	153	7 (4.6%)	32 (21%)	22 (14%)	68 (44%)	24 (16%)	3.5	1.1
Hematology	151	14 (9.3%)	39 (26%)	6 (4.0%)	59 (39%)	33 (22%)	3.4	1.3
Project Management	151	5 (3.3%)	35 (23%)	36 (24%)	55 (36%)	23 (15%)	3.4	1.1
Report Writing	155	5 (3.2%)	53 (34%)	34 (22%)	46 (30%)	17 (11%)	3.1	1.1
Microbiology	152	24 (16%)	61 (40%)	10 (6.6%)	40 (26%)	17 (11%)	2.8	1.3
Budgeting	155	25 (16%)	48 (31%)	34 (22%)	40 (26%)	8 (5.2%)	2.7	1.2
Histology/Pathology	149	23 (15%)	80 (54%)	10 (6.7%)	25 (17%)	11 (7.3%)	2.5	1.2
Other highly specific disciplines (ex. electron micro, virology, PCR, flow)	150	34 (23%)	59 (39%)	21 (14%)	27 (18%)	9 (6.0%)	2.5	1.2

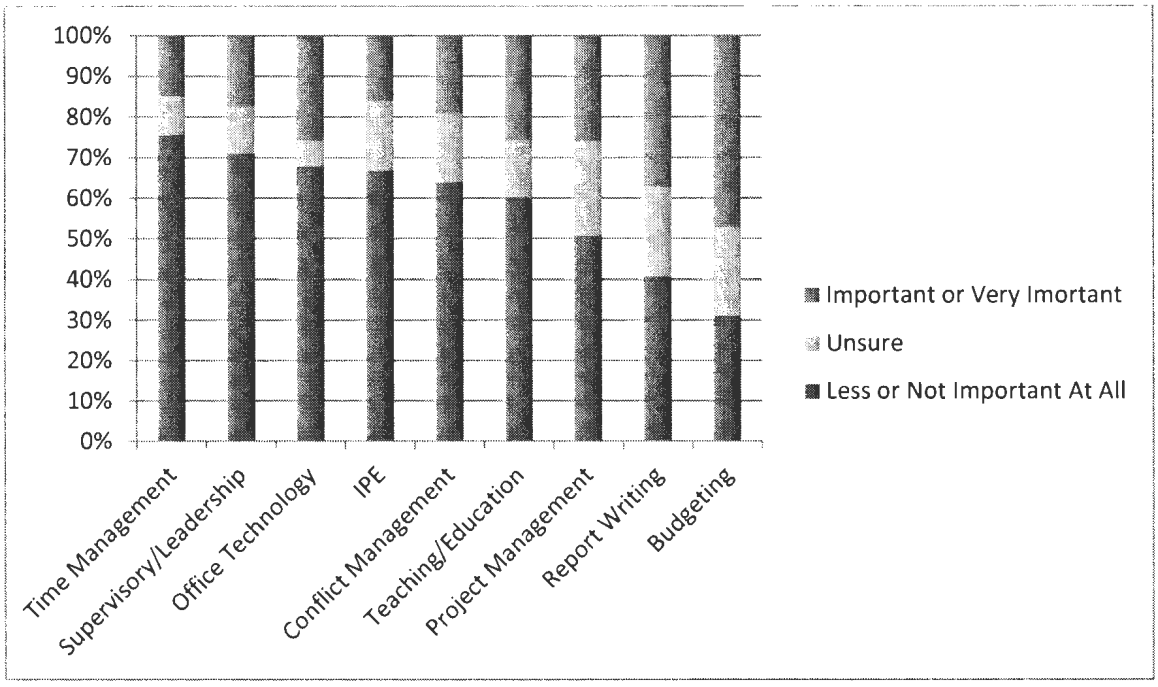

Figure 1 Non-technical topic areas by relative importance

It should be noted that non-technical areas were found to be fairly important topics for MLT professionals. Nine non-technical topic areas were explored, and in seven of these topics areas, more than half of respondents indicated these as being important or very important topics. In particular, time management and supervisory/leadership showed greater than 70% of respondents indicating importance.

Table 16 summarizes respondents' preferred CPE delivery methods. Online based approaches were ranked the highest preferred methods of delivery with the majority (95%) of respondents indicating that they would probably or definitely prefer web-based or webinar approaches to CPE. Additionally, 91% of respondents indicated that hands-on workshops would be a preferred method of delivery, while 89% indicated

that conference activities were preferred. Audio conference and didactic lecture methods were the least preferred. Respondents were also able to comment on "other and additional methods of delivery" they may have preferred. Additional comments included "grand rounds" and "individual instruction". Figure 2 represents data collected relating to those respondents who indicated that the associated delivery method would either probably or definitely be preferred by them in order of highest acceptance to lowest.

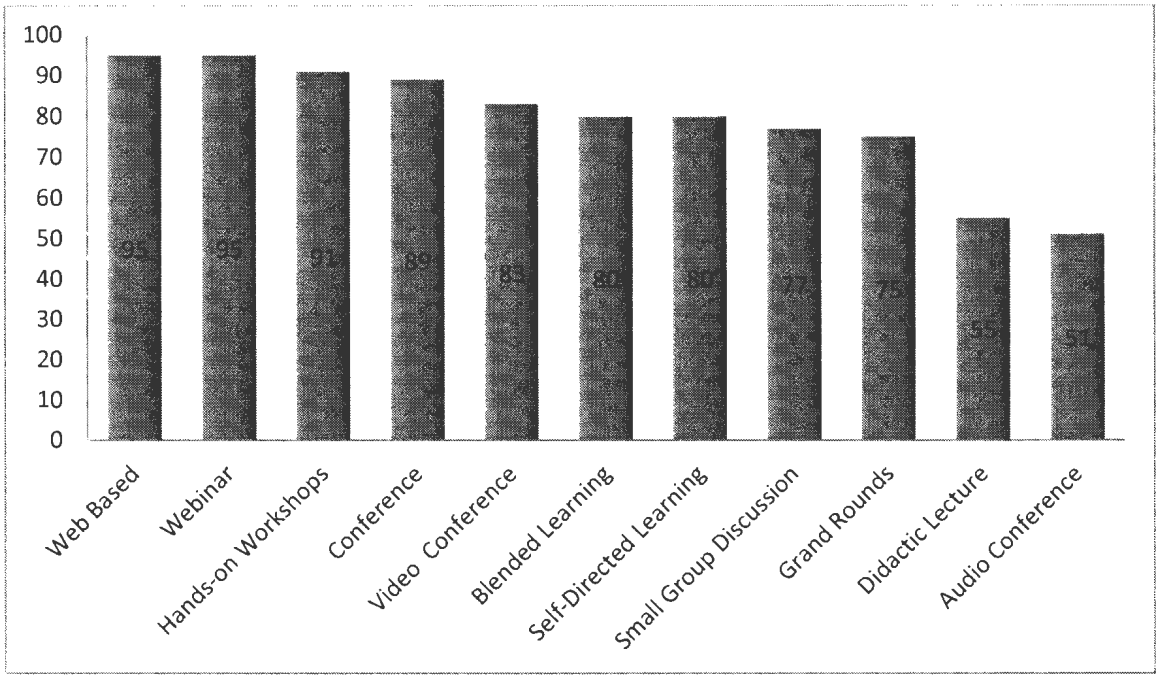

Figure 2 Preferred method of CPE delivery

Table 16 Preferred method of CPE delivery

	N	Definitely No	Probably No	Uncertain	Probably Yes	Definitely Yes	Mean	SD
Web-based	155	0 (0%)	2 (1.3%)	6 (3.9%)	69 (45%)	78 (50%)	4.4	.63
Webinar (combination of web + audio)	153	2 (1.3%)	4 (2.6%)	2 (1.3%)	76 (50%)	69 (45%)	4.3	.75
Hands-on Workshops	154	1 (<1%)	4 (2.6%)	9 (5.8%)	61 (40%)	79 (51%)	4.4	.77
Conference	155	3 (1.9%)	5 (3.2%)	10 (6.5%)	86 (56%)	51 (33%)	4.1	.83
Blended approach (e.g. combination of formats)	154	1 (<1%)	2 (1.3%)	28 (18%)	86 (56%)	37 (24%)	4.0	.73
Self-directed learning	153	1 (<1%)	9 (5.9%)	21 (14%)	78 (51%)	44 (29%)	4.0	.85
Grand rounds	151	0 (0%)	12 (7.9%)	26 (17%)	74 (49%)	39 (26%)	3.9	.86

Table 16 Preferred method of CPE delivery (continued)

Small group discussions	154	3 (1.9%)	8 (5.2%)	25 (16.1%)	78 (51%)	40 (26%)	3.9	.90
Video Conference	155	3 (1.9%)	13 (8.4%)	10 (6.5%)	92 (59%)	37 (24%)	3.9	.90
Didactic Lecture	149	2 (1.3%)	14 (9.4%)	51 (34%)	66 (44%)	16 (11%)	3.5	.86
Audio Conference	153	14 (9.2%)	42 (27%)	19 (12%)	60 (39%)	18 (12%)	3.2	1.2

Table 17 summarizes respondents' preferred participation time for CPE activities. The majority of respondents (72%) indicated a preferred delivery time that fell Monday to Friday between 9 and 5 pm. A majority (91%) of respondents also indicated that participation was not preferred in the summer months and 72% indicated that the months between January and April were preferred.

Table 17 Preferred CPE participation times

CPE Delivery Time	N	%
Monday – Friday (9 – 5)	111	111 (71.6%)
Evenings	73	73 (47.1%)
Weekends (Saturdays & Sundays)	40	40 (25.8%)
Winter Months (January – April)	112	112 (72.3%)
Fall Months (September – December)	70	70 (45.2%)
Summer Months (May – August)	14	14 (9.0%)

Table 18 summarizes respondents' perceptions of barriers and enablers to CPE participation. Staff shortages within the workplace were seen as the largest barrier to CPE participation with 70% of respondents indicating that shortages were a barrier to a great or very great extent. Cost of program and cost of travel to a program were also rated as key barriers to a very or great extent by a majority of respondents (61% and 54% respectively).

Table 18 Perceptions of Barriers to CPE

Variables	N	To Little or No Extent	To Some Extent	To a Moderate Extent	To a Great Extent	To a Very Great Extent	Mean	SD
Staff Shortages within the Workplace	147	14 (9.5%)	16 (11%)	13 (8.8%)	33 (22%)	71 (48%)	3.9	1.4
Cost of Program	150	14 (9.3%)	17 (11%)	28 (19%)	40 (27%)	51 (34%)	3.6	1.3
Cost of Travel to Program	152	19 (13%)	21 (14%)	29 (19%)	34 (22%)	49 (32%)	3.5	1.4
Personal/Family Responsibilities	152	17 (11%)	42 (28%)	34 (22%)	36 (24%)	42 (28%)	3.4	1.3
Program Topic Not Relevant	152	9 (5.9%)	41 (27%)	21 (14%)	40 (26%)	41 (27%)	3.4	1.3
Lack of Interest in Topic	150	17 (11%)	37 (25%)	37 (25%)	31 (21%)	28 (19%)	3.1	1.3
Distance to Travel of Program	152	31 (20%)	28 (18%)	33 (22%)	26 (17%)	34 (22%)	3.0	1.4
Length of Program (e.g., too long, too short)	150	22 (15%)	37 (25%)	51 (34%)	30 (20%)	10 (6.7%)	2.8	1.1

Table 19 summarizes respondents' perceptions of enablers to CPE participation. A majority of respondents (82%) indicated that greater workplace-based CPE would enable their participation to a great or very great extent, while 82% indicated that increased employer support would have a similar effect.

Table 19 Perceptions of Enablers to CPE

Variables	N	To Little or No Extent	To Some Extent	To a Moderate Extent	To a Great Extent	To a Very Great Extent	Mean	SD
Increased Employer Support for CPE participation	150	2 (1.3%)	8 (5.3%)	16 (11%)	53 (35%)	71 (47%)	4.2	.93
Workplace Based CPE	151	3 (2.0%)	7 (4.6%)	16 (11%)	64 (42%)	61 (40%)	4.1	.93
Greater Distance and or Online CPE offerings	150	4 (2.7%)	21 (14%)	34 (23%)	44 (29%)	47 (31%)	3.7	1.1
Participation with my colleagues in the same CPE activities	149	8 (5.4%)	15 (10%)	36 (24%)	59 (40%)	31 (21%)	3.6	1.1
Greater Awareness of Available CPE	150	10 (6.7%)	17 (11%)	40 (27%)	42 (28%)	41 (27%)	3.6	1.2
Mandatory CPE Requirements	148	9 (6.0%)	30 (20%)	40 (27%)	38 (26%)	31 (21%)	3.4	1.2
Greater Evening/Weekend	150	34 (23%)	29 (19%)	36 (24%)	32 (21%)	19 (13%)	2.8	1.3

During survey administration, respondents were also asked to indicate any other additional comments that they felt were pertinent to CPE. A total of 31 comments were collected from respondents. Comments were evaluated and categorized based on existing qualitative thematic categories. A number of themes previously identified were again

present in the comments section. Lack of awareness of CPE options, as well as an increased demand for future CPE was reiterated by multiple respondents. Additionally, comments relating to a desired change in the MLT attitude towards CPE emerged with further reference to a lack of employment sector support and increased desire for such support. Comments also existed, which reflected and further supported themes emerging from other methods of the study. Respondents described themes of staff shortages, support for CPE, lack of support, and concerns relating to familial and situational barriers to CPE.

Chapter four provides an overview of the data collected during the research process. Chapter five will serve to highlight and discuss several key characteristics within the data, and elaborate on the underlying significance of the data collected to allow a number of conclusions to be drawn.

CHAPTER 5

DISCUSSION

The purpose of this research was to explore the CPE preferences, attitudes, and needs of MLTs within NL. The goal was to highlight factors, concerns and issues that may have an impact on the future design and delivery of CPE activities, following the implementation of MCE in NL. This chapter will serve to discuss the implications of the study findings.

5.1 Discussion of Results

The characteristics of the MLT population exhibit some notable features, particularly the ratio of females to males (Grant, 2003b; Keeping, 2000). Females dominate the profession with just over 85% of members nationally (CIHI, 2011). Additionally a national average age of 45 is present in regulated provinces (CIHI, 2011) putting many technologists within a reach of retirement (assuming a retirement age of 55). This is similar to that which is observed in the nursing profession, which shows a national average age of 44.8 (Canadian Institute for Health Information, 2012). Nationally, the majority of technologists operate in clinical environments, working in diagnostic areas related to initial certification. Larger hospitals or urban environments typically employ more technologists than their rural counterparts.

The survey respondent sample of MLTs appeared to be representative of both provincial and national demographic characteristics. The majority of respondents were

female. This trend was also apparent in relation to approximate age of the respondents as the majority of respondents were older (e.g., closer to retirement) with a greater number of years of work experience. The majority of participants identified themselves as working in an urban setting, primarily in a diagnostic area of expertise, consistent with national demographics (CIHI, 2011) and the CSMLS competency profile (CSMLS, 2005). Additionally, the majority of participants identified themselves as working within the Eastern region of the province, which is consistent with the relative population dynamics of NL (Statistics Canada, 2013). When these demographics are considered in relation to the total MLT population, the survey sample appears to be representative of the total population.

NL has seen significant changes in the regulatory requirements for a number of allied health professions. As discussed earlier, a major change in this system has been the introduction of MCE for regulated health professionals. This is consistent with most Canadian provinces which have introduced regulations and mandatory CPE for laboratory professionals (CIHI, 2011). As noted previously, there has been limited research into the impact that this has had on MLTs in Canada. While some research suggests that MLTs are supportive of CPE activities, and can perceive the potential benefits associated with CPE (Hagus, 2000; Summers, Blau, & Ward-Cook, 2000), other studies suggest that such factors as poor prospects for career advancement have been viewed as de-motivating to MLT participation in CPE (Grant, 2004a).

In their study relating to the evaluation of pharmacists' attitudes and experiences in Northern Ireland, Haughey et al. (2007) indicated that pharmacists strongly supported

the concept of CPE with 84.7 % either agreeing or strongly agreeing that it was essential for all practicing pharmacists to engage in CPD. Results from the current study indicate that 97% of MLT respondents either agreed or strongly agreed with this same statement. NL MLT professionals reported that CPE was essential, beneficial, an excellent means to update their skills, and would likely ensure a higher quality of patient care. NL MLT professionals appear to be in strong agreement relating to the potential benefits associated with CPE. This result appears to support an accepted ideology common throughout the reviewed literature discussed in chapter two, that health professionals value continuing educational opportunities and see it as an important means to ensure quality patient care.

Grant (2004a), however, indicated that there were variations between the opinions of Canadian MLT professionals certified in recent years with those of later years. MLT survey respondents in the current study reported some varying opinions and attitudes towards CPE based on age and years of experience. Grant (2004a) also indicated that earlier certified technologists in Canada were more likely to participate in CPE activities which correlated well with findings from an earlier U.S. study (Maher, 1996). NL MLT professionals who were older than 50 years of age indicated higher means scores for participation in CPE activities than those aged 40 years or less. MLT professionals reporting more years of experience also reported higher mean scores on the attitude scale, indicating that older MLTs could have greater interest or more positive views of CPE. Interestingly this perspective was contradictory with results obtained in the pharmacist's survey, which indicated that pharmacists registered before 1979 were less likely to agree with some of the positive statements relating to CPD (Haughey et al., 2007).

General perceptions of CPE were also found to be quite positive amongst the MLT respondents. MLT respondents felt that they understood the concept of CPE with 87% either agreeing or strongly agreeing. However, receptiveness towards the introduction of mandated CPE appears to be less widespread amongst NL MLT professionals. In a question relating to whether or not 30 hours of CPE should be mandatory, participants indicated moderate support (55% agreeing or strongly agreeing) though 66% of respondents indicated that MLT professionals must make sufficient time for CPE. This result compared well with that of the pharmacy community in 2004 (Haughey et al., 2007). Despite this relative perceived support, when questioned around sanctions relating to CPE, MLTs did not appear to have the same convictions as observed in their general attitudes. Forty one percent (41%) of respondents neither agreed nor disagreed when asked if there should be sanctions for MLTs who do not meet their CPE requirements. Haughey et al. (2007) indicated that Irish pharmacists who did not support the sanctions were less likely to have completed 30 hours of CPD in the previous 12 months and a similar phenomna was observed within the NL MLT community.

While sanctions may be perceived as a negative method of encouraging CPE particpation, aspects of more positive enablers are explored further in the study. The majority of participants indicated some level of CPE participation in the previous 12 month period, indicating a moderate level of participation in CPE within the previous year. The majority of MLT professionals also reported identification of learning needs, portfolio maintenance, and evaluation of CPE portfolios, in the previous 12 month period. As well, over 90% of survey respondents reported that they had at least

"sometimes" participated in CPE in the previous 12 months, while 67% indicated that they had at least "sometimes" maintained a CPE portfolio.

Questions relating to the effect of MCE systems upon participation rates in CPE have been raised by some studies. In a U.S. study, McCoy (1987) indicated that MCE had no effect on the reported learning activities of laboratory professionals. Kerka (1994) also discusses the argument that requiring participation may hinder learning by reducing motivation and individual responsibility, and the MLT Learning Network indicates that a majority of MLTs participate in some form of CPE with no discussion of regulatory requirements (MLT Learning Network, 2010). In the current study, 47% of respondents indicated that mandatory CPE requirements could potentially enable their participation. Mandatory CPE requirements was rated as the second least important of the enablers explored within the survey questionnaire. Additional research should be conducted in order to fully evaluate the impact of regulation within the province but is beyond the scope of this discussion.

The overall attitude towards CPE within the MLT community appears to be very positive. MLT professionals report a strong commitment to CPE as indicated by the relatively high mean scores of acceptance, participation, and understanding of CPE. Though the focus group results seem to indicate a varying opinion relating to the importance or value of CPE, the survey findings indicate the majority of MLTs within the province are accepting of CPE as a concept and as method of increasing their skills.

Informal learning activities appear to be integral part of the CPE repertoire for the MLT profession in NL. The concept of learning from each other is well established

within the NL MLT culture as represented by a long tradition of hosting provincial congress activities that have universally held some form of learning component (NLCMLS, 2013). The MLT Learning Network (2010) identified a strong tendency for MLT professionals to participate in mentoring activities and the current entry level certification program in NL utilizes a significant preceptor approach (College of the North Atlantic, 2013). Additionally, the hierarchical classification system for MLT professionals currently in place lends itself to substantial informal learning. Grant (2004a) indicates that MLTs are self-directed in their learning, though much of her research focuses heavily on formal degree level learning and the potential implementation of degree level entry to practice. Additionally, when the existence of numerous national and provincial congress activities is compared against the structure of the NLCMLS CPE requirements (see Appendix A); it would appear that MLTs seem to favor activities that are not necessarily targeted towards baccalaureate level or other formal education. The MLT degree movement observed in the early part of the century (Grant, 2002; Grant, 2003a) showed mixed results relating to baccalaureate level education, and the removal of the advanced registered technologist (ART) curriculum by the CSMLS in 2012 (CSMLS, 2013b) seems to indicate that MLTs nationally are less inclined to engage in baccalaureate level programming. Results from this research appear to support this perspective.

The survey responses indicated very strong acceptance of both mentoring activities as well as the role of networking with other health professionals. Over 84% of participants either agreed or strongly agree that mentoring activities were a useful

approach to CPE and that networking with other laboratory professionals is an important part of CPE participation. MLT respondents appeared to be strongly in favor of such informal learning approaches. This was further demonstrated with the acceptance of interprofessional approaches to learning. The majority of MLT respondents (72%) indicated that they felt interprofessional approaches to learning - learning with, from and about other professionals - were important to them.

As identified earlier within the research, MLTs are often perceived as being invisible in the healthcare system. MLTs may experience very limited patient contact depending on their work environment and their role in the laboratory. It should be noted that this may not necessarily be deemed a negative trait by all MLTs, as low patient contact has been identified as a factor contributing to selection of the MLT profession (Keeping, 2006). That is, individuals may initially be attracted to the profession due to its limited patient contact and invisible role. Yet, with this limited patient contact, components of interprofessional collaboration (IPC) or IPE could be perceived as being limited, as the patient arguably serves as the central common factor of health care professionals. Given this potential for relatively low IPC, it was expected that IPE approaches to learning may be relatively less important than others, yet the survey data contradicts this notion. MLTs appear to favor IPE, perhaps as a way to raise the profile and visibility of the profession or to extend beyond the boundaries of the laboratory. This finding of acceptance towards IPE/IPC within the MLT community is very encouraging as it speaks to the nature of the important role MLTs play in the health care team. Given the growth in interprofessional teams in recent decades and trends towards collaboration

in health care (Reeves, 2009; Reeves, Lewin, Espin, & Zwarenstein, 2010), it may also be perceived that NL MLTs are eager to explore and expand upon their somewhat invisible role and are highly interested in further health professional collaboration.

In a 2003 survey, more than half of MLTs surveyed indicated that they did not support a baccalaureate degree for entry into practice citing concerns regarding benefits and costs, relevance, workforce issues, and access (Grant, 2003a). The same survey identified that a number of MLTs cited resentful, derogatory, and self-depreciating comments when questioned about degree entry to practice. Reference to baccalaureate degrees occurred throughout focus group discussion of this research and a number of focus group participants indicated either completing or having begun a baccalaureate degree program. Respondents showed a substantial shift in their preference when questioned about CPE activities structured towards baccalaureate degrees. Only 32% of respondents agreed or strongly agreed that they preferred CPE activities leading towards a baccalaureate degree, while 64% of respondents indicated that they preferred activities leading towards a certificate/credential other than their professional license. This result confirms findings made by Grant (2003a), and it appears that while credentialing in general may be important to the NL MLT community, this credentialing desire may not necessarily be associated with baccalaureate degrees. It is also possible that existing baccalaureate degrees programs hold little appeal to the MLT community as CPE relevance was also cited as an important consideration. Further research into this area may prove beneficial.

Preferred participation time for CPE was also explored and the survey yielded some interesting results. In recent years distance based education, which can arguably be completed largely outside the traditional time constraints of the classroom, has begun to trend in many university/college settings (CVU, 2013). Within NL, both primary educational institutions (Memorial University and College of the North Atlantic) pride themselves on increasing accessibility for working adults though increased distance education programs (Government of Newfoundland and Labrador, 2005a). When questioned about their preferred time for participation, 71% of those surveyed indicated a preferred time of Monday to Friday, between the hours of 9am to 5pm. This seems to indicate that most MLTs would prefer to be engaged in CPE activities throughout the normal work day. However, 47% also indicated that they preferred evenings while only 26% preferred Saturdays and Sundays. It is interesting to note that just under half of MLTs surveyed appear to be interested in pursuing CPE during evenings and presumably on their own time. Distance based models to learning may offer the most flexibility to CPE when one considers the preferred delivery times presented by the MLTs surveyed. Additionally, summer months appeared to be the least preferred as only 9% of survey respondents indicated that they would prefer CPE at this time. It should be noted that within NL, clinical MLTs operate on a year round schedule consistent with typical hospital operation and anecdotal evidence suggests preference for vacation during the summer months. The winter months of January – April were perceived as the preferred time for participation, with 72% of respondents indicating that they would prefer this time of year. Interestingly, the NLCMLS annual conference and AGM is traditionally

scheduled in October (NLCMLS, 2013). This event has traditionally served as a significant source of CPE for MLTs within NL and data suggests that the population may be more enticed to participate if an alternate time were proposed. Further research into this topic may prove beneficial, in particular to the NLCMLS.

The MLT is typically a highly technical profession with roots within a number of broad scientific disciplinary areas. Unlike traditional scientific study however, research and the scientific method are less emphasized than those technical skills related to clinical practice (Grant, 2004b). The role of the MLT is however, changing due to increased public accountability, changing diagnostics, and emersion of the MLT as a more pronounced profession. A vast majority of respondents (92%) indicated that quality control or quality management (QC/QM) topics were either important or very important to them. It is likely that this interest is largely related to the current climate of QC/QM within the laboratory communities of the province. Following the CIHRT, laboratories within NL were mandated to undergo external accreditation as a recommendation from the CIHIRT (Cameron, 2009). The agency chosen for this process was the Ontario Laboratory Accreditation (OLA). OLA functions as an external quality assessment program which is mandatory in Ontario, and focuses heavily on the utilization of ISO standards as a basis for evaluating quality procedures (Bradley, 2007). For this reason, many MLTs have been inundated with new QA/QM material, which has made this particular topic highly significant in the current NL laboratory setting. In addition to this external accreditation process, it must be noted that quality control is a ubiquitous component of the laboratory community, as QA/QM has direct and daily impact on

virtually all practicing MLTs (CSMLS, 2005; Grant, 2005; NLCMLS, 2013) forming an essential part of the core skills required of the MLT profession. This is a natural component of the complex testing that MLTs conduct in their normal duties.

Time management was also observed as being a significant variable and may be related to the staff shortage barrier indicated by participants. A lack of time in general has also been documented by Grant (2004a) as being a significant consideration related to CPE participation in the national MLT community. This may be related to an increased demand on diagnostic services and perhaps relates again, to staff shortages within the clinical environments. This may serve to contribute to the perceived need for increased time management skills. Supervisory and leadership skills were also rated as significant topics of interest which may reflect the changing role of the MLT profession. Additionally, office technology was seen as a substantial topic of interest relating to CPE. The notion of office technology as a topic of interest was also observed though the focus group discussions.

Non-technical employees such as managers and educators were more likely to indicate that QA/QC was a very important topic as opposed to either class of technical staff. Managers and educators were also less likely to indicate basic laboratory skills as an important topic as compared to their technical counterparts. Additionally, both hematology and transfusion science (common generalist areas of expertise) were rated substantially higher by general technical staff versus non-general technical staff further indicating MLTs are interested in CPE that is directly linked to their current work environment. Managers and educators were also more likely to indicate IPE, report

writing, and conflict management as being important or very important future CPE topics.

Managers and educators appeared to be more interested in topics relating to oversight, education, and management, while technical staff appeared to have an interest directly related to their duties. Qualitative analysis and comments indicated at the end of the survey noted aspects CPE topic relevance, as being an important factor to the MLT community, further supporting the argument that MLT CPE topics should be targeted towards specific job skills as per the following comments:

> *"There are no cytology courses offered through [omitted] or [omitted], what courses that are offered through [omitted] that are called cytology are not really relevant."*
>
> *"I am discouraged by having to study topics that are of no relevance to me."*
>
> *"And better ways of doing what we already do. Not business courses.... Not business courses. I am doing my B.Tech and you do economics and religion."*

Numerous CPE topic areas were found to be important to the MLT population, yet an exploration of delivery methods was also warranted. While multiple approaches to continuous learning delivery exist, in recent years web-based technologies in particular have grown as a significant modality for the delivery of online forms of CPE (Cantor, 2008; Merriam et al., 2007). Curran et al. (2006b) indicate that the use of distance learning technologies and the design of self-directed learning systems for MCE are examples of best practices for enhancing access to CPE activities. Curran (2011) further identified several common delivery method options associated with CPE, which

incorporate numerous learning methodologies such as didactic training, online learning, and conference based approaches, as well as blended and self-directed approaches.

Web-based approaches to learning were ranked as the most preferred method of delivery and this reflects, in part, growing trends towards greater adoption of online learning environments and a shift towards increased virtual learning environments (Cantor, 2008; CVU, 2013). Hands on learning was also rated as being substantially preferred by survey respondents, which is perhaps best explained by the technical nature of the MLT work environment. Laboratory medicine is a highly tactile discipline marked by substantial kinesthetic activities which correlates well with hands on learning approaches. Grant (2004a) and the MLT Learning Network (2010) indicated that the MLT was also a self-directed learner and a majority of respondents (80%) indicated positive perception to self-directed approaches to learning.

Modern clinical laboratories almost universally operate using software known as Laboratory Information Systems (LIS) for record management (Turgeon, 2012); therefore, MLTs by necessity are somewhat technologically oriented. Interestingly, LIS systems within NL do not typically utilize software packages such as Microsoft Office for word processing, perhaps explaining its appeal as a topic for CPE. Didactic lecture and conference participation were found to be less preferred by MLTs who reported working in a rural community. Reasons for this may be linked to limited access to formal learning opportunities for MLTs within rural NL, in addition to the geographic limitations associated with conference participation.

According to the CCL (2007) situational, institutional, dispositional, and academic barriers are common classifications utilized in educational literature when discussing barriers to education. Grant (2004a) reported a number of barriers relating to professional development (PD) participation indicating that respondents from rural areas were twice as likely to report not undertaking PD activities in comparison to those from urban areas. Grant (2004a) also identified that a lack of time appeared to be the greatest obstacle with PD activities, and noted a number of other barriers including lack of recognition from employers, lack of suitable courses, costs, and personal/household responsibilities. The most predominant barrier perceived by survey respondents was an aspect of staff shortage within the workplace. This notion of staff shortage was captured during focus group discussion and may be related to the lack of time as identified by Grant (2004a). Personal and family responsibilities were also seen as relatively important, supporting Grant's (2005) research as well as substantial educational literature, which cites family responsibilities as a major barrier to CPE (Cantor, 2008; Friedman, 2012; Merriam et al., 2007). Additionally, costs were seen as significantly impacting the ability to participate in CPE with both costs of CPE and programming/travel costs, being seen by a majority of participants, as impacting to a great or a very great extent.

Personal and family responsibilities have historically been highlighted as a more significant barrier for females than males (McWhirter, 1997; Merriam et al., 2007). As an example, within the nursing profession (a similarly female dominated profession) Ofosu and Mallette (1998) noted that there was an on ongoing conflict between child

bearing, child rearing, and the special needs of the nursing profession. Relating to the MLT, Grant (2003b) further indicated that men identified lack of employer recognition, cost, and insufficient time as their primary barriers while women were more likely to indicate concerns related to household and family responsibilities. The data analysis found no significant difference between males and females in relation to their identification of personal/family responsibilities. It is possible that child-bearing and other familial related responsibilities may not have been clearly indicated by the item statement.

Curran (2011) identified community size as a key factor in relation to health provider's participation in resuscitation training and updates, while Penz et al. (2007) indicated that a substantial portion of nurses perceived barriers directly related to living in a rural or remote community. Grant (2004a) identified that year of certification (years of experience) and relative age was a factor relating to professional development participation. MLTs from rural communities were far more likely to indicate staff shortages and distance to travel as being significant barriers to CPE participation. Staff shortages also appeared to be a significant barrier in rural regions. Given that the location of the primary MLT education program in NL is within the urban center of St. John's, this was again, an expected outcome due to recruitment issues that have been observed in the rural health authorities of NL in recent years (Government of Newfoundland and Labrador, 2005b). Survey respondents with less than 20 years of experience were also more likely than those with greater than 20 years to indicate personal/family responsibilities as barriers to CPE. Given that previous literature

highlights aspects of child rearing as a significant influence on CPE participation, it is possible that those individuals falling within this experience level would be more likely to have dependent children.

Staff shortages appear to be a significant barrier throughout the province but are more substantial in rural communities and are added by an additional barrier of distance. While costs were discussed substantially within focus group interviews, costs associated with CPE were perceived as having only a moderate influence on participation and did not appear to differ based on any demographic variables. Additionally, program relevance indicated moderate impact on CPE participation. Focus group discussion indicated a number of perceptions that program topics could be more appropriate to laboratory medicine within NL. The results relating to perceived barriers provide valuable information which is in relative agreement with prior research into CPE barriers.

Increased employer support was seen as the most important enabler to CPE participation. Grant (2004a) noted that a lack of time was a primary consideration and an often cited barrier related to MLT participation in CPE activities. Time also emerged as a substantial barrier to CPE from the focus group research and staff shortages impacting workloads were clearly indicated by survey respondents as being a major consideration. Thus, while support may often be perceived as directly financial in nature (e.g., funding to participate in CPE), additional consideration such as time to engage in CPE may be of equal or even greater significance. Respondents indicated that workplace based CPE would influence their CPE participation.

5.2 Scope and Limitations

The MLT profession is fundamentally accountable to the public and as such, is likely to experience significant influence from government, industry, and the public. As such, needs assessment as it relates to the MLT community could have been broader in its scope. The study population was confined to practicing medical laboratory technologists within NL and the results must be considered within that context. Medical laboratory assistants (MLA) and technicians (similar to the MLA) were excluded from the survey due to a relatively low number of recent graduates and decreased direct continuing education requirements. Currently MLAs are not regulated within NL and are, therefore, not subject to MCE prescribed by the NLCHP. This survey serves to address only the current perceptions of laboratory professionals and makes recommendations regarding what technologists perceive in regards to the workplace. CSMLS certified technologists that are working outside of the public sector or clinical setting, such as those employed in private sector were likely omitted from study due to a potential lack of licensing requirements as placed upon them by their employers (e.g., all employers may not require a professional license). Note that this represents a very small number of the total population.

The quantitative survey resulted in a response rate representative of approximately 30% of the total MLT population. A multiple wave survey approach based on the TDM (Dillman, 2007) was utilized in an attempt to boost response rates. Online surveys encounter challenges associated with low participation, respondents who may be uncomfortable with computer based surveys, possible response bias, question

ambiguity, and misunderstanding of the questions (Creswell, 2012; Dillman, 2007). It is also possible that only those technologists interested in CPE were willing to participate in a CPE survey, perhaps creating an attitudinal bias. Additionally, given a lack of complete contact information for all technologists of the province, it is possible that only approximately two thirds of the MLT population in NL were ultimately surveyed. Survey instruments also run risks of improper wording, unclear questions, unclear response options, and lack of applicability of all questions, which can create ambiguous data (Creswell, 2012). Concerns also arise regarding self-reporting and self-assessed needs, which may not reflect a complete picture of needs assessment (Mann, 1998), as well as the potential for multiple responses during quantitative data collection, given that an email list was not maintained.

Despite these limitations, based on available demographic information, the survey population appears to be representative of the true NL MLT population, and a statistically significant sample was obtained. Mixed methods research has been shown to be very useful in developing a complex picture of social phenomenon when elements of qualitative and quantitative data are analyzed together (Creswell, 2012). The survey instrument utilized was developed from an existing and validated instrument, and was informed by practicing MLTs. As such, within the scope of practicing medical laboratory technologists within NL, a number of valid conclusions may be drawn.

5.3 Conclusions

First and foremost, the findings suggest that MLTs within NL are strongly supportive of increased CPE opportunities. Participation rates, attitudinal scores, and general perceptions surrounding CPE suggest that members of the MLT profession are eager and willing to engage in further CPE than has previously been seen. Many MLTs are supportive of the mandated educational requirements put forth through the legislative process, agreeing that MLTs must make sufficient time for CPE. The overall implication of this acceptance is that a present and future demand for increased CPE is apparent. Educational providers and MLT employers are likely to benefit from increased investment in CPE opportunities and options, for the MLT community as MLTs clearly represent a growing market for health professional educational providers.

While MLTs clearly demonstrate a perceived need for CPE, it is evident that numerous limitations have had a significant influence on CPE participation. Though frequently identified as financially oriented, these limitations or barriers expand beyond those which are purely monetary in nature. Staff shortages in rural areas of the province combined with significant travel limitations and the natural geographic isolation of the province have fostered, with the exception of online learning, environments poorly suited to a number of traditional CPE options. Thus, the further expansion of formal CPE options in online format through post-secondary institutions, combined with increased non-formal workplace based CPE through regional health authorities of the province, should be a priority in the development of effective MLT CPE. MLTs are likely to benefit greatly from CPE approaches that strive to overcome those barriers identified by

this research. Additionally, while MLT baccalaureate degree programs were observed as being less important than other types of formal credentialing, a significant value appears to be present surrounding formal education and online learning in addition to non-formal and informal education. Therefore, the development of additional baccalaureate degree, diploma, or other certificate level programs specifically structured to meet the needs of the MLT community should remain a priority for both formal and non-formal educational providers.

Furthermore, while non-formal learning opportunities were seen as very important to MLTs, these non-formal options (e.g., conferences, grand rounds) are perceived to be difficult to participate in, given the isolation of various rural communities and the related staff shortages. This finding indicates that increased monetary support in the form of increased travel allowances, educational leave, or educational grants may prove to enable additional CPE participation (though this has yet to be evaluated). Educational providers and employers would likely benefit from investment in educational options that consider the rural nature and isolated geography of the province. In addition to the appeal that non-formal learning opportunities seems to have within the NL MLT environment, it was found that MLTs strongly prefer CPE that is designed around the standard work week and is directly related to their day to day activities. Given that MLTs highlight concerns relating to finance and personal or family responsibilities, it is likely that increased work-based CPE may prove beneficial to the CPE participation rates of MLTs and allow for substantial ease in maintaining minimum CPE requirements.

Finally, with respect to the nature of CPE topics, given the impact of quality control (QC) and quality management (QM) in the past several years as a result of both external and internal factors, quality control and quality management were identified as the most important CPE topics. Given the importance placed on QC/QM processes, and a general perceived lack of awareness of CPE options, the MLT community is likely to benefit greatly from increased formal and non-formal quality management programming that has been structured specifically towards the clinical environment. While quality processes were identified as the most appealing topics relating to CPE, a number of other topics were also identified as being significantly important to the NL MLT community and should be strongly considered in the development of effective CPE options. Notably, many of these were non-technical in nature such as time management and leadership which were identified as major topics of interest. It should also be noted that MLTs are in strong preference for technologically oriented methods of learning. Online learning was identified as a strongly preferred form of CPE and as such educational providers are likely to benefit from the development of further online programming options for the practicing MLT.

5.4 Suggestions for Further Research

This research has explored a number of areas related to CPE within the MLT community of NL and while it has allowed for a number of conclusions to be drawn, it has raised a number of questions. Most significant of these relates to the timing of this research. During the development of this thesis, the NL MLT community underwent a

dramatic shift from a voluntary system of CPE to one which has been mandated by the provincial government. This of course raises significant questions around the motivational factors of the MLT community. For example were attitudes positive because it was a fresh topic? Will mandating CPE actually increase participation, or has it been artificially boosted by looming licensure? What other barriers and enabler exists to CPE participation for this unique group of professionals? Future research is required in this area. In particular, it will be important to explore these questions once the MCE model has been in place for several years to examine how the NL MLT community responds to MCE.

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APPENDIX A

Tech Education Credit Requirements as Listed by NLCMLS (NLCMLS, 2013)

Activity	*Credit value*
Category 1: Professional Activities	
Preparation and initial presentation of courses, seminars, workshops or on site CE session (Those in a teaching roles get credit for only preparation of new subject material)	*0.1 credit/ hour of preparation and lecture to a maximum of 1 credit*
Laboratory Related Tutoring (outside of work hours- credit for preparation of teaching)	*0.1 credit/ hour of preparation*
Administering a program of continuing education such as Journal article of the month or case study group	*0.5 credit/ year*
Serve on workplace professional committees, boards or regulatory bodies quality, safety, WHMIS, CSMLS/ NLSMLS or conventions	*0.5 credit/ year up to a maximum of 1 credit / 4 year cycle*
Publishing an academic book review	*0.5 credit/ review*
Publishing scientific articles in CSMLS or NLSMLS Journals	*0.5 credit/ 1000 words 1.0 credit/ 3000 words or greater*
Publishing a scientific paper in a recognized professional journal	*3.0 credits/ paper*
Category 2: Non laboratory related - Transferable skills	
Computer courses	*0.1 credit / hr to a max of 1 credit in a four year cycle*
Human relation courses	
Communications courses	
Business courses	
Leadership	
Organization	
Project management	
Human resource	
Category 3: Lab Related Professional Learning	
Education courses offered by providers accepted by CSMLS	*0.1credit/ hr PEP criteria*
CSMLS, CACMLE or other medical laboratory science courses	*0.1credit/ hr PEP criteria*
Lab Related University courses	*0.1credit/ hr course listing*
International, National, Provincial and Regional	*0.1credit/ hr education*

Conferences	*events on conference listing*
Professional conferences and Education days/symposium - Maritech, CSMLS Congress, CLMA, AACC, ASM etc.	*0.1credit/ hr education events on conference listing*
Professional workshops and seminars	*0.1credit/ hr*
Teleconferences/ Telemedicine / lectures/presentations	*0.1credit/ hr*
Medical grand rounds	*0.1credit/ hr*
Reviewing lab related videos and loan library videos	*0.1credit/ hr*

Maximum credit value activities	**Credit Value**	**Maximum Limit**
Key operator training by vendor for new equipment	*0.1credit / hour*	*1 time credit value for learning (no credits for teaching)*
LIS Initial new version Training	*0.1credit / hour*	*Maximum 0.5 credit/ 4 year cycle*
New process or procedure training in an existing or a new work area	*0.1credit / hour*	*Maximum 1 credit/ 4 year cycle*
Recertification of professional requirements i.e. OH&S, TDG and WHMIS	*0.1credit / hour*	*Maximum 0.5 credit/ 4 year cycle*
Reading journals and articles	*0.1 credit / article*	*Maximum1 credit/ 4 year cycle*
Answering questions on a monthly case study, journal article etc.	*0.025 credit/activity*	*Maximum 1 credit/ 4 year cycle*

APPENDIX B

Consent Letter and Explanation of Purpose to Focus Group – A Participants

The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research (such as the way you have been treated or your rights as a participant), you may contact the Chairperson of the ICEHR at icehr@mun.ca or by telephone at 709-864-2861.

To the participant,

You have been invited to participate in a focus group that will be utilized to develop a quantitative questionnaire for a research study that will function to explore the continuing education perceptions of laboratory technologists within the province of Newfoundland and Labrador. This research is being conducted in partial fulfillment of the Memorial University of Newfoundland Master of Education (Post-Secondary Studies) as a thesis based research approach for the undersigned.

The purpose of this research is to explore the continuing professional education needs, interests and attitudes of medical laboratory technologists in Newfoundland and Labrador. The hope is that a deeper understanding of the needs and wants of working technologists will potentially aid educational providers in developing programming for continuing education. This has become increasingly important with the implementation of licensing and continuing education requirements as put forth by the Newfoundland and Labrador College of Medical Laboratory Science (NLCMLS). As a profession we are entering a new era of continuing professional education and our need for suitable continuing professional education options has never been greater.

Your participation in this focus group is strictly voluntary and data collected will be utilized for the development of a survey to be administered to the Medical Laboratory Technologist (MLT) community. Data will not be utilized for any other purpose but will be kept for a minimum of five years in accordance with Memorial University's policy on Integrity in Scholarly Research. You will be asked to participate in a small focus group with the primary researcher as well as other technologists and professionals from across the province. This focus group will be approximately 1 hour in length and will consist of a number of open ended questions in which you will be asked your thoughts and encouraged to provide your expertise. This dialogue will be recorded by the researcher and analyzed for prevailing themes in discussion between you and other participants. Key findings in the focus group will be used to develop a survey, which will be delivered to the technologists in the province, in an attempt to help determine what their CPE needs and wants are. Data collected will remain on file for a minimum of five years as required by Memorial University's policy on Integrity in Scholarly Research. All data pertaining

to personal information will be removed to protect your confidentiality and your personal information will not be shared with anyone other than those directly involved with this research. Participation in this study carries with it no known risks or obligations and you will retain the right to fully withdraw for any reason, which does not have to be disclosed to the researcher. You also retain the right to have your responses to the survey removed from the research at any point.

Your participation in this research study while voluntary is greatly needed. Continuing education within the province is reaching a pivotal point and your input to develop an appropriate questionnaire is invaluable. The goal of this research will be to increase awareness of continuing education programming needs as they apply to laboratory medicine. The results of this research will be made available to all participants through the NLCMLS website and you will be encouraged to review.

A consent letter has been included in this invitation. Please read it carefully and if you agree to participate, please ensure that any concerns you have are addressed before you sign. In the event that you have concerns with any one or all aspects of the study or consent, please feel free to contact the undersigned at your convenience.

In the event that you agree to participate in the study, please bring your signed consent form to the focus group.

Kind regards,

Greg Hardy
E-mail: greg.hardy@cna.nl.ca
Phone: (709) XXX-XXXX

Additional Notes: Please read carefully

1. The researcher will undertake to safeguard the confidentiality of the discussion, but cannot guarantee that other members of the group will do so. Please respect the confidentiality of the other members of the group by not disclosing the contents of this discussion outside the group, and be aware that others may not respect your confidentiality.

2. Because the participants for this research project have been selected from a small group of people, all of whom are known to each other; it is possible that you may be identifiable to other people on the basis of what you have said.

3. *After your focus group discussion, and before the data are included in the final report, you will be able to review the transcript for your discussion, and if you see fit, change, or delete information you do not wish to remain.*

APPENDIX C

INFORMED CONSENT FOR FOCUS GROUP A PARTICIPANTS

The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research (such as the way you have been treated or your rights as a participant), you may contact the Chairperson of the ICEHR at icehr@mun.ca or by telephone at 709-864-2861.

Study Title:

An exploration of the continuing education needs, preferences and attitudes of medical laboratory technologists in Newfoundland and Labrador

Acknowledgement: To be filled out by focus group participant

1. I have received and read the: "Consent Letter and Explanation of Purpose to Focus Group – A Participants"
2. I have had the opportunity to ask questions regarding the study and my questions have been answered to my satisfaction.
3. I have been adequately informed about the nature of the study, its purpose, rationale and its associated risks.
4. I have been informed and understand that I may withdraw from the study at any point without providing reason.
5. I have been informed that my focus group discussion will be audio recorded so that the researcher may evaluate and analyze my responses and discussion of the questions.
6. I agree to participate in this study.
7. I agree that the researcher may utilize and store my response data in their research approach to develop a survey that will be made available to the MLT community of NL.

I _____ acknowledge that I have read and agree with the statements made in this form and agree to participate in this study.

Signature: _____ Date: _____

Acknowledgement: To be filled out by the principal researcher

1. I have explained the research approach and study to the best of my ability.
2. I have provided opportunity for participants to ask questions regarding all aspects of the study.
3. I believe that participants have engaged in this study by their own accord and received no monetary incentive to participate from the researcher or anyone else.
4. I believe that I have explained any potential risks to the participant to the best of my abilities.

I _____ acknowledge that I have read and agree with the statements made in this form and agree to participate in this study.

Signature: _____ Date: _____

APPENDIX D

Consent Letter and Explanation of Purpose to Focus Group – B Participants

The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research (such as the way you have been treated or your rights as a participant), you may contact the Chairperson of the ICEHR at icehr@mun.ca or by telephone at 709-864-2861.

To the participant,

You have been invited to participate in a focus group that will be utilized to develop a quantitative questionnaire for a research study that will function to explore the continuing education perceptions of laboratory technologists within the province of Newfoundland and Labrador. This research is being conducted in partial fulfillment of the Memorial University of Newfoundland Master of Education (Post-Secondary Studies) as a thesis based research approach for the undersigned.

The purpose of this research is to explore the needs, perceptions and concepts surrounding continuing education within the medical laboratory community of the province. The hope is that a deeper understanding of the needs and wants of working technologists will potentially aid educational providers in developing programming for continuing education. This has become increasingly important with the implementation of licensing and continuing education requirements as put forth by the Newfoundland and Labrador College for Medical Laboratory Science (NLCMLS) following the commission on hormone receptor testing.

Your participation in this focus group is strictly voluntary and data collected will be utilized for the development of a survey to be administered to the medical laboratory technologist (MLT) community. Data will not be utilized for any other purpose but will be kept for a minimum of five years in accordance with Memorial University's policy on Integrity in Scholarly Research. You will be asked to participate in a focus group with the primary researcher as well as other leading members of the medical laboratory community. These members will be inclusive of those involved with the medical laboratory advisory committee, managers, quality control personal, educators and administrators. This focus group will be approximately 1 hour in length and will consist of a number of open ended questions in which you will be asked your thoughts and encouraged to provide your expertise. This dialogue will be recorded by the researcher and analyzed for prevailing themes in discussion between you and other participants. Key finding in the focus group will be used in conjunction with a second focus group of bench level technologists to develop a survey which is to be delivered to the technologists in the province. It is the hope of the researcher that this survey will help determine the continuing education needs and wants of the provinces technologists. Data collected will

remain on file for a minimum of five years as required by Memorial University's policy on Integrity in Scholarly Research. All data pertaining to personal information will be removed to protect your confidentiality and your personal information will not be shared with anyone other than those directly involved with this research. Participation in this study carries with it, no known risks or obligations and you will retain the right to fully withdraw for any reason, which does not have to be disclosed to the researcher. You also retain the right to have your responses to the survey removed from the research at any point.

Your participation in this research study while voluntary is greatly needed. Continuing education within the province is reaching a pivotal point and your input to develop an appropriate questionnaire is invaluable. The goal of this research will be to increase awareness of continuing education programming needs as they apply to laboratory medicine. The results of this research will be made available to all participants through the NLSMLS website and you will be encouraged to review.

A consent letter has been included in this invitation. Please read it carefully and if you agree to participate, please ensure that any concerns you have are addressed before you sign. In the event that you have concerns with any one or all aspects of the study or consent, please feel free to contact the undersigned at your convenience.

In the event that you agree to participate in the study, please bring your signed consent form to the focus group.

Kind regards,

Greg Hardy
E-mail: greg.hardy@cna.nl.ca
Phone: (709) XXX-XXXX

Additional Notes: Please read carefully

1. *The researcher will undertake to safeguard the confidentiality of the discussion, but cannot guarantee that other members of the group will do so. Please respect the confidentiality of the other members of the group by not disclosing the contents of this discussion outside the group, and be aware that others may not respect your confidentiality.*

2. *Because the participants for this research project have been selected from a small group of people, all of whom are known to each other; it is possible that you may be identifiable to other people on the basis of what you have said.*

3. After your focus group discussion, and before the data are included in the final report, you will be able to review the transcript for your discussion, and if you see fit, change, or delete information you do not wish to remain.

APPENDIX E

INFORMED CONSENT FOR FOCUS GROUP B PARTICIPANTS

The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research (such as the way you have been treated or your rights as a participant), you may contact the Chairperson of the ICEHR at icehr@mun.ca or by telephone at 709-864-2861.

Study Title:

An exploration of the continuing education needs, preferences and attitudes of medical laboratory technologists in Newfoundland and Labrador

Acknowledgement: To be filled out by focus group participant

1. I have received and read the: "Consent Letter and Explanation of Purpose to Focus Group – B Participants"
2. I have had the opportunity to ask questions regarding the study and my questions have been answered to my satisfaction.
3. I have been adequately informed about the nature of the study, its purpose, rationale and its associated risks.
4. I have been informed and understand that I may withdraw from the study at any point without providing reason.
5. I have been informed that my focus group discussion will be audio recorded so that the researcher may evaluate and analyze my responses and discussion of the questions.
6. I agree to participate in this study.
7. I agree that the researcher may utilize my response data in their research approach to develop a survey that will be made available to the MLT community of NL.

I _____ acknowledge that I have read and agree with the statements made in this form and agree to participate in this study.

Signature: _____ Date: _____

Acknowledgement: To be filled out by the principal researcher

1. I have explained the research approach and study to the best of my ability.
2. I have provided opportunity for participants to ask questions regarding all aspects of the study.
3. I believe that participants have engaged in this study by their own accord and received no monetary incentive to participate from the researcher or anyone else.
4. I believe that I have explained any potential risks to the participant to the best of my abilities.

I _____ acknowledge that I have read and agree with the statements made in this form and agree to participate in this study.

Signature: _____ Date: _____

APPENDIX F

ONLINE SURVEY INVITATION

The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research (such as the way you have been treated or your rights as a participant), you may contact the Chairperson of the ICEHR at icehr@mun.ca or by telephone at 709-864-2861.

Dear participant,

You have been invited to participate in a study that will function to explore the continuing professional education needs, interests and attitudes of medical laboratory technologists in Newfoundland and Labrador. This survey is being conducted in partial fulfillment of the Memorial University of Newfoundland Master of Education degree (Post-Secondary Studies) as a thesis based research approach for the undersigned.

After you have read this explanation, if you decide to participate, please continue to the survey and submit your response at the end. Your completion of this online survey will be taken as implied consent to utilize and include your responses in the research approach.
The purpose of this research is to explore the needs, interests and attitudes surrounding continuing education within the medical laboratory community of the province. The hope is that a deeper understanding of the needs and wants of working technologists will enable educational providers to develop continuing education programming that is more applicable to laboratory medicine. This has become increasingly important with the recent implementation of licensing/regulation and the continuing professional education requirements put forth by the Newfoundland and Labrador College for Medical Laboratory Science (NLCMLS).

Your participation in this research is strictly voluntary and data collected will be utilized for the purposes of this research study only. Data collected will remain on file for a minimum of five years as required by Memorial University's policy on Integrity in Scholarly Research. To maintain anonymity and confidentiality, the survey program being used in this study is FluidSurveys.com. FluidSurveys.com stores all of its survey data in Canada. This survey can be completed from any computer with internet access and should take no more than 10 minutes of your time. Within the survey, data pertaining to personal information will not be collected.

Demographics information will be limited to age, gender, years of work experience and approximate geographic location. Participation in this study carries with it no known risks or obligations and you will retain the right to withdraw for any reason.

Your participation in this research study is encouraged. Continuing professional education for the Medical Laboratory profession within the province of Newfoundland and Labrador has reached a pivotal stage and the findings from this research study will inform future programming that is applicable to the laboratory medicine field. A summary of the final results of this research will be made available to all participants through the NLCMLS website and you will be encouraged to review.

If you have any concerns or questions about the research study please feel free to contact the undersigned at your convenience.

Kind Regards,
Greg Hardy, MLT, M.Ed. (candidate)
Memorial University
Faculty of Education
greg.hardy@cna.nl.ca
n17gsh@mun.ca
(709) XXX-XXXX

APPENDIX G

APPROVED FOCUS GROUP SCRIPT

1. What are your thoughts on the state of continuing professional education (CPE) for medical laboratory technologists within the province?

2. What are your thoughts on the professions' acceptance of CPE? Employer's acceptance?

3. How is participation in CPE supported by employers within the province?

4. What do you feel are the incentives for participation in CPE within our province? Why?

5. What do you feel are the major barriers for medical laboratory technologists' participation in CPE within the province?

6. What are the key professional, organizational and technological changes influencing the medical laboratory technology profession and how might these influence "needs" for CPE?

7. What are the most important topics that should comprise CPE for medical laboratory technologists?

8. Who do you envision are the key providers of CPE for medical laboratory technologists?

9. How can access to CPE be improved for medical laboratory technologists in the province?

10. What are the key features or aspects of effective CPE you would look for?

APPENDIX H

ONLINE SURVEY INSTRUMENT

Section 1 - Demographic Information

Please indicate your age group

- ☐ ≤ 25
- ☐ 26 - 30
- ☐ 31 - 35
- ☐ 36 - 40
- ☐ 41 - 45
- ☐ 46 - 50
- ☐ 51 - 55
- ☐ 56 - 60
- ☐ 61 - 65
- ☐ >65

How many years of work experience do you have in the field of medical laboratory science?

- ☐ 0 – 5 years
- ☐ 6 – 10 years
- ☐ 11 – 15 years
- ☐ 16 – 20 years
- ☐ 21 – 25 years
- ☐ >25 year

Gender

- ☐ Male
- ☐ Female

What is the size of the community in which you work?

- ☐ Rural (population
- ☐ Small Town (population 5000 – 9,999)
- ☐ Urban (population >10000)

Please indicate your primary geographic work location.

- ☐ Eastern Newfoundland
- ☐ Central Newfoundland
- ☐ Western Newfoundland)
- ☐ Northern Peninsula
- ☐ Labrador
- ☐ Other, please specify... _____

What is your primary area of employment expertise?

- ☐ Clinical Chemistry/Biochemistry
- ☐ Hematology/Hematopathology
- ☐ Histology/Pathology/Histotech
- ☐ Microbiology/Virology/Mycology
- ☐ Transfusion Medicine/HTLA
- ☐ Education
- ☐ Management
- ☐ Quality Management
- ☐ Other, please specify... _____

What is your current employment status?

- ☐ Full-time permanent
- ☐ Full-time temporary
- ☐ Part-time permanent

☐ Part-Time temporary

☐ Casual

☐ Unemployed

☐ Retired

☐ Other, please specify... _____

Section 2 – Attitudes towards Continuing Professional Education (CPE)

Continuing professional education (CPE) is the means by which people maintain their knowledge and skills related to their professional lives.

Please indicate your level of agreement with the following statements related to CPE:

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
It is essential for all practicing MLTs to engage in CPE.	○	○	○	○	○
CPE is a beneficial use of an MLTs time.	○	○	○	○	○
The implementation of CPE would ensure a higher quality of patient care.	○	○	○	○	○
CPE is an excellent means by which MLTs can update their professional knowledge and skills.	○	○	○	○	○
MLTs should routinely keep a CPE portfolio which provides evidence of their professional competence.	○	○	○	○	○
It should be mandatory for MLTs to undertake 30 hours of CPE per year.	○	○	○	○	○
MLTs who fail to engage in CPE will fall below the required standard of professional competence.	○	○	○	○	○
I have been provided with sufficient information and training about the concept of CPE.	○	○	○	○	○

Engaging in CPE will make MLTs more confident and professional in their approach to patients.	○	○	○	○	○
MLTs must make sufficient time to engage in CPE.	○	○	○	○	○
CPE should be undertaken by MLTs without additional payment.	○	○	○	○	○

Scale adapted from: Haughey, S. L., Hughes, C. M., Adair, C. G., & Bell, H. M. (2007). Introducing a mandatory continuing professional development system: An evaluation of pharmacists' attitudes and experiences in Northern Ireland. International Journal of Pharmacy Practice, 243-249.

Section 3 - Experiences with Continuing Professional Education (CPE)

Please indicate your level of agreement with the following statements related to your experiences with CPE

In the past 12 months, I have:

	Never	Rarely	Sometimes	Frequently	Always
Participated in some type of CPE	○	○	○	○	○
Identified my own learning needs.	○	○	○	○	○
Maintained a CPE portfolio which provides evidence of my professional development.	○	○	○	○	○
Evaluated the progress I have made with my CPE.	○	○	○	○	○

Please indicate your level of agreement with the following statements related to your experiences with CPE:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I completely understand the concept of CPE.	○	○	○	○	○
There should be sanctions for MLTs who do not meet their CPE requirements.	○	○	○	○	○

Obtaining a credential/certificate other than my professional license is important when I select CPE activities.	○	○	○	○	○
Mentoring activities, where one learns from more senior colleagues in the workplace, is a useful approach for CPE.	○	○	○	○	○
Networking with other laboratory professionals is an important part of CPE participation.	○	○	○	○	○
I prefer to obtain my CPE credits through provincial or national congress activities.	○	○	○	○	○
I prefer CPE activities that lead towards a baccalaureate degree.	○	○	○	○	○
Inter professional* approaches to learning are important to me.	○	○	○	○	○

* Learning with other health professionals

Scale adapted from: Haughey, S. L., Hughes, C. M., Adair, C. G., & Bell, H. M. (2007). Introducing a mandatory continuing professional development system: An evaluation of pharmacists' attitudes and experiences in Northern Ireland. International Journal of Pharmacy Practice, 243-249.

Section 4 – Topics of Interest

Please indicate how important the following topics are to you in your CPE activities.

	Not Important At all	Less Important	Unsure	Important	Very Important
Quality Control/Quality Management	○	○	○	○	○
Basic laboratory skills	○	○	○	○	○
Microbiology	○	○	○	○	○
Hematology	○	○	○	○	○

Transfusion Science	○	○	○	○	○
Histology/Pathology	○	○	○	○	○
Other highly specific disciplines (ex. electron microscopy, virology, PCR, flow cytometry...)	○	○	○	○	○
Teaching/Education (e.g. how to teach/supervise students)	○	○	○	○	○
Office technology (e.g. Microsoft Word, PowerPoint)	○	○	○	○	○
Report Writing	○	○	○	○	○
Time Management	○	○	○	○	○
Project Management	○	○	○	○	○
Supervisory and Leadership Skills	○	○	○	○	○
Budgeting	○	○	○	○	○
Conflict Management	○	○	○	○	○
Inter-professional education/collaboration	○	○	○	○	○
Other 1 (Please specify below)	○	○	○	○	○
Other 2 (Please specify below)	○	○	○	○	○
Other 1					
Other 2					

Section 5 – Preferred Methods of Continuing Professional Education (CPE) Delivery

Please rate your preferred CPE program delivery format.

	Definitely No	Probably No	Uncertain	Probably Yes	Definitely Yes
Audio Conference	○	○	○	○	○

Video Conference	○	○	○	○	○
Web-based	○	○	○	○	○
Webinar (combination of web + audio)	○	○	○	○	○
Didactic Lecture	○	○	○	○	○
Hands-on Workshops	○	○	○	○	○
Conference	○	○	○	○	○
Grand rounds	○	○	○	○	○
Small group discussions	○	○	○	○	○
Blended approach (e.g. combination of formats)	○	○	○	○	○
Self-directed learning	○	○	○	○	○
Other 1 (Please specify below)	○	○	○	○	○
Other 2 (Please specify below)	○	○	○	○	○
Other 1					
Other 2					

Section 6 - Preferred Time for Continuing Professional Education (CPE) Participation

When is your preferred time for participating in CPE? (check all that apply)

Monday – Friday (9-5)	☐
Evenings	☐
Weekends (Saturdays and Sundays)	☐
Summer Months (May to August)	☐
Fall Months (September to December)	☐
Winter Months (January to April)	☐

Section 7 – Barriers to Continuing Professional Education (CPE) Participation

Please rate the extent to which each of the following factors are barriers to your participation in CPE activities.

	To little or no extent	To some extent	To a moderate extent	To a great extent	To a very great extent
Personal/Family Responsibilities	○	○	○	○	○
Length of program (e.g., too long, too short)	○	○	○	○	○
Lack of interest in topic	○	○	○	○	○
Program topic not relevant	○	○	○	○	○
Distance to travel to program	○	○	○	○	○
Cost of travel to program	○	○	○	○	○
Cost of program	○	○	○	○	○
Staff shortages within the workplace	○	○	○	○	○
Other 1 (Please specify below)	○	○	○	○	○
Other 2 (Please specify below)	○	○	○	○	○
Other 1					

Section 8 – Enablers to Continuing Professional Education (CPE) Participation

Please rate the extent to which each of the following factors would enable your participation in CPE activities.

	To little or no extent	To some extent	To a moderate extent	To a great extent	To a very great extent
Workplace-based CPE	○	○	○	○	○

Greater evening/weekend CPE offerings	○	○	○	○	○
Greater awareness of available CPE	○	○	○	○	○
Participation with my colleagues in the same CPE activities	○	○	○	○	○
Increased employer support for CPE participation	○	○	○	○	○
Greater distance and/or online CPE offerings	○	○	○	○	○
Mandatory CPE requirements for re-licensure	○	○	○	○	○
Other 1 (Please specify below)	○	○	○	○	○
Other 2 (Please specify below)	○	○	○	○	○

Other 1 [ ]

Other 2 [ ]

Section 9 – Additional Comments & Thanks

Please add any comments you may have about CPE in general.

[ ]

Thank you for participating.